

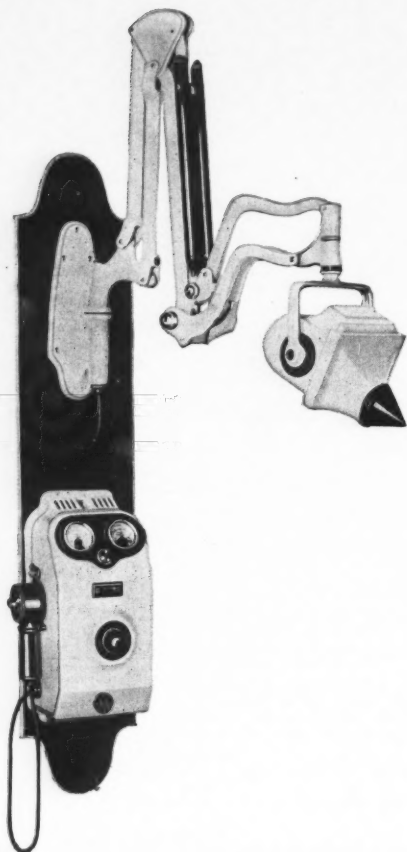
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March
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The DENTAL DIGEST



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THE ORTHODONTIC TREATMENT OF IMPACTED AND UNERUPTED TEETH

HARRY B. WRIGHT, D.D.S.

Philadelphia

THE developmental forces of the human organism, the sum total of which, we term Nature, has decreed that all the permanent teeth shall be present and in their correct positions, if we are to have a normal occlusion; however, it is frequently noticed that one or several of the teeth fail to erupt and will not do so unless assisted.

While every one will agree that it is easier to extract an impacted tooth than to aid its eruption, the baneful consequences from such extraction spells ultimate distortion to the dental arch with probable impairment to the normal health and function of the organism.

OPERATIVE PROCEDURE

One must determine by roentgenographic diagnosis, definitely and accurately, the relative position of the crown of the tooth to the surrounding tissues. This position having been found, the area is anesthetized; a circular incision is made about the area of the crown, and the tissue, includ-



Fig. 1A



Fig. 1B

Fig. 1—A, Roentgenogram showing unerupted cuspid in position before treatment. (Case 1). B, Twenty-eight months later with cuspid in place. Note that portion of pin is left in place and acts as an efficient filling material.



Fig. 3

Fig. 3 — Roentgenogram showing unerupted cuspid before treatment (Case 2).

ing the bony process overlying the tooth, is removed by the use of chisels, in order freely to expose the crown. Styptic gauze is held over this portion until there is some cessation of bleeding. A hole, about 2 mm. deep is drilled obliquely into the lower third of the crown of the tooth in such a way as not to approach the pulp. An iridio-platinum wire staple 0.020 inch-

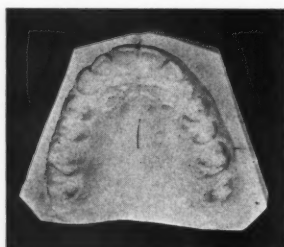


Fig. 2A



Fig. 2B

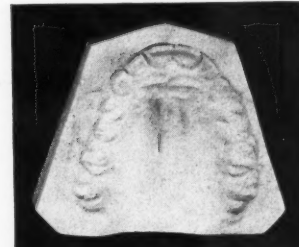


Fig. 2C

Fig. 2—A, Plaster cast before treatment (Case 1). Note left temporary cuspid unexfoliated. B, Mershon lingual appliance in position with free end of auxiliary spring engaging staple, cemented in tooth. C, Cast made twenty-eight months later showing permanent cuspid in position.

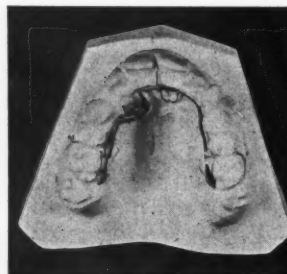


Fig. 4A

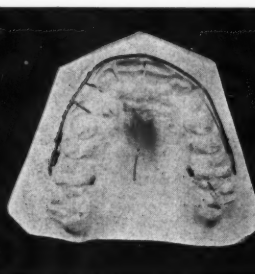


Fig. 4B



Fig. 4C

Fig. 4—A, Mershon lingual arch adjusted with free end of recurved auxiliary wire engaging the staple for buccal movement of right maxillary cuspid (Case 2). B, Cast made one year later with labial round wire arch adjusted having auxiliary wire springs. 0.020 inches in thickness exerting stimuli for the creation of necessary space. C, Cast made two months later than (B) with Mershon lingual arch adjusted. Note auxiliary spring adjusted for rotation of maxillary right first bicuspid and auxiliary spring for buccal movement of cuspid, which is now in position.

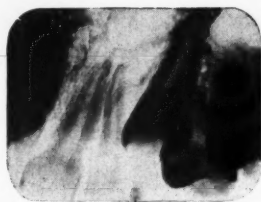


Fig. 5

Fig. 5—Roentgenograms showing bilateral maxillary labial cuspid impactions before treatment (Case 3).



Fig. 5



Fig. 7

Fig. 7—Impacted mandibular left second bicuspid, before treatment (Case 4).



Fig. 6A

Fig. 6B

Fig. 6C

Fig. 6—A, Cast before treatment (Case 3). B, Cast made eight months later. Left first premolar was removed. Note lingual arch adjusted with auxiliary springs for labial movement of incisors, and labial arch with auxiliary springs adjusted to staples in impacted teeth, these springs having a "safety pin coil" as an aid to posterior movement. C, Cast of case made thirty months later with both cuspids in position.

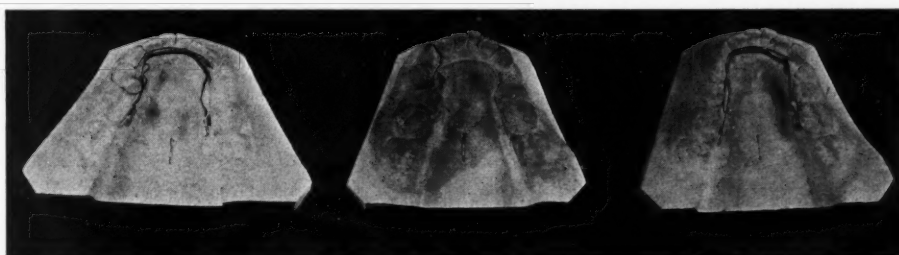


Fig. 8A

Fig. 8B

Fig. 8C

Fig. 8—A, Cast with lingual arch adjusted (Case 4). Note auxiliary wire exerting anterior pressure on first premolar for creating space. Note auxiliary wire for the development of the anterior segment of the arch. B, Cast made twenty months later with impression of lingual arch in position. Note that space is developing for the reception of the second bicuspid which has now erupted and is in lingual position. C, Cast made six months later than (B) with bicuspid in position. Lingual arch is now adjusted for general rounding out of mandibular arch.



Fig. 9A

Fig. 9—A, Impacted maxillary right central before treatment (Case 5). B, Thirty-three months later, central in correct position, with remainder of pin in situ.



Fig. 9B



Fig. 11A

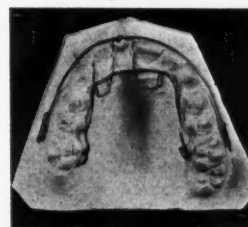


Fig. 11B

Fig. 11—Two views of cast made nine months later (Case 5). (1) Lingual arch with auxiliary springs, adjusted for the creation of necessary space; (2) the sacrifice of tissue for the exposure of impacted incisor crown; (3) wire link connecting staple with labial arch wire. Motive force is obtained by bending arch wire incisally and springing it cervically for the engagement of incisal end of link.



Fig. 10A



Fig. 10B

Fig. 10—Two views before treatment (Case 5).

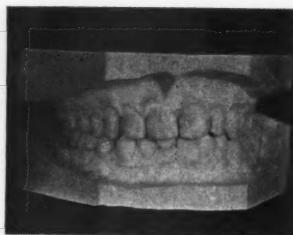


Fig. 12A



Fig. 12B

Fig. 12—Two views of cast made two years later than the one in Fig. 11, completed case.



Fig. 13—Photograph of patient taken one year after cessation of treatment showing the teeth in occlusion.

es in thickness and one-fourth inch in length is cemented into the cavity. The surrounding tissues are bathed with a solution of adrenalin chloride and the patient dismissed for one week. It is well to adjust regulating

appliances to gain the necessary space for the descent of the unerupted teeth before the surgical exposure is performed. On the subsequent visit, auxiliary wires, 0.020 inches in diameter, can be soldered to the main arch

for the direction of stimulus for eruption. The diameter of the main arch wire is 0.040 inches in thickness.

The accompanying illustrations¹ show examples of cases treated.

¹As the negatives were not available positive prints are used.—Editor.

723 Medical Arts Building.

PREEXTRACTION METHOD OF RECORDING DISTANCE BETWEEN UPPER AND LOWER JAWS

E. D. FLYNN, D.D.S., of Gordon, Nebraska, suggests a simple method of recording the distance between the upper and lower jaws if two opposing teeth are missing which is a common condition. The accompanying drawing illustrates this method.

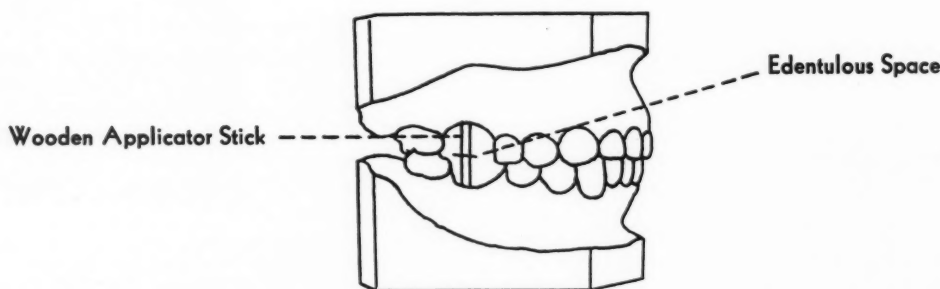
A wooden cotton applicator is cut to fit snugly between the crests of the ridges. After the occlusal line is marked the stick is placed in an envelope and filed away. After the extraction of the teeth and at the time the bite is taken, a mark is made on the edentulous area with an indelible pencil, and the bite rims are placed in the mouth and withdrawn together. The indelible mark is trans-

ferred to the upper rim and a hole the same size as the stick is drilled at this point. The stick is inserted in this hole and the bite rims are trimmed accordingly.

Frequently there are edentulous spaces on both sides. When centric occlusion is being obtained, the sticks are cut at the marks indicating the occlusal plane and inserted through holes bored in the lower base plate which has been heavily reinforced with modeling compound. The point at which these holes are bored is indicated by indelible marks transferred to the base plate from the mouth. The sticks are waxed securely in order that they will not slant or tip.

A roll of base plate wax is pressed over them and on the heavy base plate on the molar area of each side. The area from bicuspid to bicuspid is free from wax.

After the insertion of the upper bite rim, the lower is placed in the mouth, the patient instructed to protrude the mandible as far as possible, then to retrude the mandible as far as possible. This is repeated several times and at the farthest point of retrusion the patient is instructed to close on his "back teeth." The wooden sticks will act as stops, thus preventing overclosure which is a common occurrence in the construction of full upper and lower dentures.



WHY DENTAL CARIES WITH MODERN CIVILIZATIONS?

VIII. FIELD STUDIES OF MODERNIZED INDIANS IN TWENTY COMMUNITIES OF THE CANADIAN AND ALASKAN PACIFIC COAST

WESTON A. PRICE, D.D.S., M.S., F.A.C.D.

Cleveland

IN the report presented in the February issue of *THE DENTAL DIGEST*, installment 7 of my series, data were presented dealing with the modernized Indians of the interior, chiefly of Canada. That environment provided different native foods from those which are available on the Pacific watershed which will be dealt with in the present report. We will first consider evidence which relates to the physical and particularly the dental conditions of the Indians who inhabited the Pacific slope a thousand or more years ago. To find this information, a visit was made to the Vancouver Museum which fortunately possesses well preserved specimens of prehistoric periods. Some of the skulls to be seen here were uncovered while cutting through a hill for a street extension in the city of Vancouver. Above was a virgin forest of large green furs and underneath them in the soil there were preserved fallen trunks of other large trees. Several feet below these, burials were uncovered containing skeletons of a stalwart early Indian race.

Two skulls are shown in Fig. 1. It will be noted that the teeth are well formed and are free from dental caries. In the light of our newer knowledge it is important to note that the arches are symmetrical and the teeth in normal and regular position and occlusion. Since these skulls are of adults and some others are of elderly people their freedom from dental caries at the time of their death demonstrates that at least so far as the permanent teeth are concerned there had never been a period in their lives during which they suffered from this malady. Since the first permanent molars which erupt at about 6 years of age were free from tooth decay it is probable that the deciduous teeth were also immune to dental caries.

It is important to study the conditions of the living successors of these people as found in the same general community. Accordingly, we examined the teeth and general physical condition of the Indians in a reservation in North Vancouver (number 4 on the map, Fig. 1 of installment 7) so situated that they



Fig. 1—Skulls of prehistoric Indians which illustrate the fine symmetry of the dental arches and freedom from caries.

have the modern conveniences and modern foods. In this group of children between 8 and 15 years of age 36.9 per cent of all the teeth examined had already been attacked by dental caries. No people who lived largely on native foods were found in this group.

It was of particular interest to study the Indians near Victoria on Vancouver island in the Craigflower Indian Reservation (number 5 on the map). Indeed the city of Victoria has been partly built on the original Craigflower Indian Reservation. As the need became acute for the territory reserved for them an arrangement was made whereby the Indians were induced to exchange that land for new land in an adjoining district

in which a new house was built for each family. Besides an allotment of land a sum of money was given to each family reported to be \$10,000. This surely allowed them to become very modern and accordingly many of them owned automobiles and many other modern luxuries. The physical effects of these luxuries because of ample funds for purchasing any foods that they might desire was marked. They were in close proximity to skilled dental service and had practical training in oral prophylaxis. Notwithstanding this 48.5 per cent of all teeth examined had already been attacked by dental caries. Every person examined was suffering from rampant tooth decay. The original diet of the Indians of the Pacific



Fig. 2—Sitka, one of the earliest towns on the Pacific coast was the former capital of Alaska. The cathedral dates back to Russian occupation.

coast was as we shall see largely composed of sea foods, which are probably as abundant today as ever before. It is not likely, however, that they would catch their own fish when they can now purchase their fish on the open market. Like most modern people they were living on white flour products, sweet foods and pastries.

Probably few cities of the Pacific coast have had a greater abundance and variety of edible sea foods particularly the various kinds of salmon than Ketchikan (number 7 on the map). It is beautifully located on an island and is the most southerly city in Alaska. Among the many fish that are abundant along this part of the Pacific coast is the oolachan or candle fish. It is a small fish but rich in oil, so much so that it gets its name from being used as a candle by burning it for light. This oil is collected in large quantities and used as a dressing for many of their sea foods. It is also traded with the Indians of the interior for furs and other products. An Indian settlement in this city was studied and it was found that 46.6 per cent of all teeth examined had already been attacked by tooth decay. In many of the homes there was illness due to tuberculosis or arthritis. Tuberculosis had robbed many of the homes of one or more of its children.

At Wrangell at the mouth of the Stikine River all of the Indians were living almost entirely on the store foods. A study of twenty-seven of them of various ages revealed that 251 out of 644 teeth examined or 39 per cent had already been attacked by tooth decay. Two typical cases are shown in Figs. 3 and 4.

At Juneau (number 9 on the map) two groups were studied, one in the government hospital and the other in an Indian settlement. In the hospital were both Indians and Eskimos, chiefly the former. Seventy-five per cent of the patients were reported to have been brought there because they had tuberculosis and some who had come because of accident and other conditions were reported also to have tuberculosis. Approximately 50 per cent of the patients in the total hospital enrollment were under 21 years of age. The dental conditions were bad, for 39.1 per cent of all the teeth examined had been attacked by tooth decay. An important phase of the study made here had to do with facial development which will be discussed later in relation to various districts. A group of elderly primitives was found in the city every one of whom had complete dentitions in normal arrangement of the arches and without dental caries. In a settlement of modern Indians living in

Juneau principally on modern foods 40 per cent of all teeth examined had been attacked by tooth decay.

A typical illustration of an Indian whose foods throughout his life have been largely deer, bear and fish, fresh and fried, and whose teeth are still perfect except for wear at 65 years of age is shown in Fig. 4. He had been brought into the hospital because of an accident.

At Sitka (number 10 on the map) the former capital of Alaska shown in Fig. 2, two important groups were studied. There is located here the Sheldon Jackson School for Eskimos and Indian boys and girls. They have come from a widely scattered territory throughout Alaska and represent the finest physical types to be secured for the advantages of an education. Of necessity they came largely from the modernized districts. In this group 53.7 per cent of all the teeth examined had already been attacked by decay. Many of the cavities had been filled and in many mouths caries had ceased to be active. This accordingly represented largely caries that had occurred before the students came to the institution and gives an indication of the dental conditions in the large number of districts which they represented.

A group of Indians, in a settlement in this city, of various ages, were studied and it was found that 35.6 per cent of all the teeth examined had already been attacked by dental caries. A well preserved native Indian, aged 70, was found who had come into town from another district (Fig. 6). He stated that his diet had consisted chiefly of fish, fish eggs, seaweed, and deer. His teeth were in excellent condition and were entirely free from past indications of or present dental caries. He is a fine example of the product of the native dietary provided for the Pacific coast people of any period or stage of civilization if they would avail themselves of it.

The local physician at Sitka kindly gave valuable information relative to the attitude of the native Indians in the matter of obtaining fresh sea foods when foods that were satisfying could be so easily obtained in concentrated form at the various stores. They could go to one of the piers any time of the year and catch fish or secure them as they had been accustomed to do before the introduction of modern foods, but there is a constant striving to be like and live like the white people. They seem to think it is a mark of distinction to purchase their foods and that it is a cause for humiliation for one to have to forage for his foods. They readily come to depend on flour and sugar,

jams and canned vegetables, and prefer to have the government or charitable organizations supply these when they cannot purchase them rather than go out and secure their own nutrition. This physician of Sitka stated that there were about 800 whites living in the town and about 400 Indians, and that notwithstanding this difference in numbers there were twice as many Indian children born as white children but by the time they reached 6 years of age there were more white children still living than Indians and half breeds. This the physician states was largely due to the high child mortality rate, the most frequent cause for which is tuberculosis.

While it does not take many decades to record a distinct physical deterioration in the same generation, a deteriorating parenthood greatly speeds up this process. While physical defects acquired by the parent will not be transmitted as such, prenatal deficiencies may be established because of the physical defects of the mother related to her faulty nutrition, and this together with disturbed nutrition of infancy and early childhood go far, as we shall see, in determining whether there will be a physical breakdown and whether the normal defense of the body will be adequate to protect it from various infections to which it may later be exposed.

The localities that have been reviewed are situated along the Pacific coast on the islands and mainland of British Columbia and what is termed southeastern Alaska. While southeastern Alaska carries by far the largest part of the population it includes only a small fraction of the total land area. The great expanse of land constituting the Alaskan peninsula extending westward to the Bering Sea and with the Aleutian Islands reaching across nearly to the Siberian coast represents an area so great that when the maps of Alaska and the United States are drawn on the same scale and are superimposed southeastern Alaska would be over Georgia, the Aleutian Islands would be over Arizona and California and the great expanse of Alaska would cover all the central and northern states.

We used Anchorage as our point of entrance to that country by flying over the vast mountain ranges and open wilderness. Anchorage (number 14 on the map) is the principle city of western Alaska, since it is not only a base for the railroad running north to Fairbanks but a base for airplane companies operating throughout various parts of Alaska. It is accordingly a combination of a coast city



Fig. 3—A case of nearly complete destruction of the teeth to the gum line by dental caries. This woman lives on modern foods.

Fig. 4—This girl at 16 has already lost most of her teeth including some anteriors as shown.

Fig. 5—Typical excellence in form of the dental arches and structure of the teeth.

Fig. 6—A coast Indian, aged 70. His teeth are worn but the arches are excellent in form. Teeth are free from caries, past or recent.

Fig. 7—This Indian mother of eight children who have a white father has had rampant tooth decay as have her children. The family lives on modern foods.

with its retail activities and a wholesale base for outfitters for the interior. It has a good government hospital which probably has been built around the life of one man who many people told us was the most beloved person in all Alaska. He is Doctor Josef Romig, a surgeon of skill with an experience of thirty-six years among the Eskimos and Indians, both the primitives and modernized. I am deeply indebted to him for much information and assistance in meeting the proper people for my investigations. He took me, for example, to typically modernized Indian homes in the city. In one the grandmother, aged 63, who had come from

the northern shore of Cook Inlet to visit her daughter, was entirely free from tooth decay and had only lost one of her teeth. Her son had accompanied her. He was 24 years of age and had only one tooth that had ever been attacked by tooth decay. Their diet has been principally moose meat and deer meat, fresh and dried fish, and few vegetables, and at times some cranberries. Recently the son had been obtaining some modern foods. The daughter, aged 29, had married a white man and has had eight children. The first was born when she was 12 years old. She and her family are living entirely on modern foods. Twenty-one of her thirty-two

teeth have been wrecked by dental caries. Their diet now consists of white bread, syrup, and potatoes for the most part. Her children whom we examined ranged from 5 to 12 years of age, and in that family 37 per cent of all the teeth have already been attacked by dental caries, notwithstanding the young age of the children. The mother of this family is shown in Fig. 7. It is of importance that not only was dental caries rampant but there was marked deformity of the dental arches and irregularity of the teeth in the children.

Among the many items of information of great interest furnished by Doctor Romig were facts that fitted

into the picture of association of modern degenerative processes with modernization. He stated that in his thirty-six years of association with these people he had never seen a case of malignant disease among the truly primitive Eskimos and Indians though it frequently occurs when they become modernized. He similarly found that the acute surgical problems requiring operation on such organs as the gall bladder, kidney, stomach, and appendix do not tend to occur among the primitives but are common problems among the modernized Eskimos and Indians. Growing out of his experience in which he had seen large numbers of the modernized Eskimos and Indians attacked with tuberculosis which tended to be progressive and ultimately fatal so long as they remained under modernized living conditions, even with the fine hospital, he has come to make it a rule wherever it is physically possible to send such patients back into primitive conditions on primitive diets under which the death rate was much lower than under modernized conditions. Indeed Doctor Romig reported that a majority of these patients recover under the primitive type of living and nutrition.

An excellent opportunity is provided for study in the institutions that have been organized for the care of orphans and for the education of Eskimo and Indian boys and girls. A particularly favorable institution is located at Eklutna on the railroad north of Anchorage. Many of the pupils in the school had come from districts so remote from transportation facilities that their isolation had compelled them to live mostly on native foods, at least during their early childhood. They had come from districts widely distributed throughout the Alaskan peninsula. Credit is due the management of this institution since they have undertaken to prepare and store dried salmon for use throughout the winter. The beneficial effects of their good nutritional program was evident.

The percentage of teeth found to have been attacked by dental caries was 14.6. A large percentage of these pupils were of mixed blood of native Eskimos or Indians with whites. The white parent had probably been large-

ly responsible for their attendance at this training school. There were several full blooded Eskimos and Indians from modernized communities where they had been living on modern foods throughout their lives. This gave an opportunity for study of an important problem which I have discussed in the August, 1933, number of *THE DENTAL DIGEST*; namely, the role of nutritional deficiencies in the development of deformities and irregularities in the facial features, the arrangement of the teeth and the inter-relationship between the dental arches. This subject can be best discussed after we have presented data on the primitive Indians and primitive Eskimos. I will note in passing, however, that the typical irregularities and divergencies from normal were present in the full blooded Eskimo and Indian boys and girls in as high a percentage as in the mixed bloods and could be associated with the liberal use of the modern foods during early childhood. Many of the young people with parentage of mixed bloods have beautiful features. It is of interest and a pleasure to record that the people whether primitive or modernized gave us complete cooperation.

Another important institutional group was studied at Seward (number 13 on the map) in the Jesse Lee Home which had first been established as two schools, one at Nome and the other on the wind-swept island of Uralaska and had been moved to Seward to avoid the extreme isolation of those districts. This institution is charmingly located at Resurrection Bay which is one of the most beautiful harbors in the world. This home gives shelter and educational opportunities to Eskimos and Indians chiefly of mixed bloods from a large area of Alaska and particularly from the Aleutian peninsula, the Aleutian Islands, and the Bering Sea. These Eskimos and Indians, whether mixed or pure blood, had come chiefly from homes that were in large part modernized. The incidence of dental caries found here was 27.5 per cent of all teeth examined. Here again all the people were affected. The institution is excellently manned. Notwithstanding the unusually fine hygienic conditions and high-

ly trained dietitians, a medical ward and a trained nurse, tuberculosis was reaping a heavy toll.

I was told that 60 per cent of all the students (from eighty to ninety students in all) who had been moved in 1925 with the schools from Nome and Uralaska to this location were already dead from tuberculosis and that only three had it on arrival. It is common knowledge that tuberculosis has played an important part in the decimating of the Indian and Eskimo population in the Pacific coast towns and villages. A significant phase of these investigations is the development of new light on the role of nutrition in lowering the defense of these people, so that with their low inheritance of defensive factors they rapidly become susceptible to tuberculosis. I will in a later communication of this series present data on this important point.

These Indians of the Pacific coast communities whom we have been reviewing have had access to both the natural foods of this district and to foods of modern civilization. In my investigations in the Outer Hebrides as reported in the issues of June, July, and August, 1933, of *THE DENTAL DIGEST* we found that sea foods are a splendid source of both mineral and fat soluble activators and it might be expected that even those using modern foods supplemented with sea foods would suffer less from nutritional deficiencies than those on the interior away from the abundant sea foods. It was important, therefore, that Indians living in the interior be studied in both the relative primitive conditions as they are found and those in contact with modern civilization. The next communication will accordingly be a report of our studies inside the watershed in the far north.

(End of Eighth Installment.)

COMING:

- IX. Field Studies Among Primitive Indians In Northern Canada.
- X. Field Studies Among Primitive and Modernized Eskimos of Alaska.
- XI. New Light on Loss of Immunity to Some Degenerative Processes Including Dental Caries.

Dental Research Laboratories
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The Editor's Page

A RECENT commentator¹ on the subject of dental caries has pointed out the existing confusion on the subject of the etiology of this condition. Hine very properly compares this confusion to the case of the three blind men who upon examining an elephant each gave a different description. The man who grasped the tail said that what he felt was comparable to a rope; the one who touched the side of the elephant insisted that an elephant is similar to a high rough wall; while the third who felt the tusks was emphatic in his belief that the elephant resembled a spear. In the analogy between the elephant and the problem of dental caries the three descriptions of the elephant are to be compared with the three most popular views concerning the etiology of caries: (1) that the condition represents a nutritional disorder; or (2) an endocrine dysfunction; or (3) that it is bacterial in origin.

There are three distinct schools of thought with somewhat too much intolerance, as would be expected, between the members of the several schools. The nutritional advocates have often gone beyond the available scientific facts to suggest dietary measures which are bizarre and unproved. Kesel² in summarizing our knowledge of the relationship between dental caries and diet has said: "Until we are supplied with some concrete evidence as to exactly how diet is related to caries the various investigators will continue to advocate the use of this or that food factor as particularly important in the prevention and arrest of caries."

The proponents of the bacterial theory among whom Bunting is the present most prolific writer on the subject are of the opinion that caries is a process of local decalcification produced by acids formed from the fermentation of carbohydrates with aciduric bacteria initiating the action. Bunting has held the opinion for some time that the *Bacillus acidophilus* is the active bacterial agent. He has attempted by the use of drugs to control bacterial activity. In fact, in each of several years he advocated a different drug: in 1925, aniline dyes; in 1926, metaphen; in 1928, hexylresorcinol. More recent-

ly Bunting⁴ has taken the position that "the greatest promise for the ultimate solution of the problem seems to be in the study of the chemistry of the saliva and its immunologic reactions against the organism of dental caries, and in a further study of diet in its relation to dental disease."

The third school of thought is of more recent origin and the utterances of this school are still rather deeply steeped in mysticism and wild theorizing. There is no question but that the endocrine system is of great importance to the human economy. Dysfunctions of the thyroid gland, the islands of Langerhans, the gonads, for example, result in serious clinical manifestations. It is not surprising, therefore, that dentists who were acquainted with progressive medical thought might begin to wonder what possible relationship there might be between endocrine dysfunction and dental disease and malformations. The prognathism of hyperpituitarism suggested to orthodontists a possible etiologic explanation of certain types of malocclusion; the increase in the incidence of caries at puberty and during pregnancy suggested to clinical dentists a possible connection between the sex glands and the dental structures. And those interested in periodontia have frequently observed the relation of oral soft tissue disease with diabetes mellitus.

In any event the status of our knowledge on the relationship of the endocrines and the teeth is rather fragmentary and vague. To help clarify the situation the Council on Dental Therapeutics of the American Dental Association invited Isaac Schour, D.D.S., Ph.D. of the College of Dentistry of the University of Illinois to make a critical evaluation of the subject. Schour⁵ has made the following deductions:

1. In *hyperfunction* of the endocrine glands (suprarenals, thyroid, hypophysis) there is a tendency toward accelerated and marked development of the dentition while in *hypofunction* of these glands, including the parathyroids, there is likely to be found retarded eruption and incomplete development.

2. "Caries of pregnancy" is more readily explained on the basis of inadequate oral

(Continued on page 89)

¹Hine, M. K.: This Problem of Dental Caries, ORAL HYGIENE 24: 355 (March) 1934.

²Kesel, R. G.: Diet and Dental Caries, The DENTAL DIGEST 40:12 (January) 1934.

³Kesel, R. G.: What Do We Know About Dental Caries, J. A. D. A. 14:915 (June) 1932.

⁴Editorial, The Problem of Dental Caries, J. A. M. A. 102:54 (February 17) 1934.

⁵Schour, Isaac: Endocrines and Teeth, J. A. D. A. 21:322 (February) 1934.

DESIGN FOR ROUND WIRE CLASPS WITH MAXIMUM FLEXURE AND TORSIONAL ELASTICITY

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HAVING experienced a considerable amount of grief with breakage of round wire clasps, either soldered or cast to the lug rest, I sought a design that would eliminate the rigidity of attachment of the clasp arms to the lug. For several years I have used in isolated cases clasps designed as shown in Fig. 1 and have no recollection of ever having had to repair a break. For this reason I decided to use the design as standard wherever possible and I have done so for two years with satisfactory results.

Whenever it has been desirable to employ teeth to retain a removable appliance some type of attachment is used to grip the teeth chosen for the abutments. The most commonly used type is a clasp made from one continuous piece of metal, with or without a rest soldered or cast to the lug.

At the present time wrought gold alloy wires seem to be in popular favor though in spite of the recent improvement in the character of these wires much difficulty is experienced because of breakage and deformation. The failure to utilize principles of engineering and the laws of physics in the design of the clasp, and the large percentage of loss of the original qualities of the wire by laboratory treatment cause this breakage and deformation.

Laws of physics that must be observed in order to attain the best efficiency in clasp service are the following:¹

1. "Deflection under bending force is directly proportional to the third power of length and inversely proportional to the fourth power of diameter."

2. "Deflection under torsional force is directly proportional to the length and inversely proportional to the fourth power of the diameter."

From these laws of physics the following deductions are made:¹ (1) "All wire clasps should be designed so as to be as long as possible. (2) Whenever possible, both flexure and torsional elasticity should be utilized

in their design. (3) If the formula of the round wire selected has the requisite qualities (high degree of resilience, high-fusing point and capacity for heat treatment) *small gage wires are preferable.*" [Italics ours.]

Clasps made according to Fig. 1 conform to these deductions. The more resorption of the alveolus there is, just so much longer may the upright be made permitting both increased torsion and flexure. If the uprights are embedded in vulcanite there is still torsional elasticity and not the short, rigid connection of wire soldered to the lug. If the uprights are carefully placed and free from vulcanite, both torsion and flexure are permitted. It is also easier to adapt the wire for two half clasps than for a continuous one.

As the joint of the clasp wires to the bar is an appreciable distance away from the working section; i. e., the upright and arms, change in structure due to heat of soldering plus the action of the solder itself is eliminated.

Metallurgical research shows that prolonged or high heat changes the character of clasp wire. Careless soldering not only burns the wire but the alloy of the solder entering the wire actually reduces its diameter (Fig. 2).

TECHNIQUE OF CONSTRUCTION

1. An impression is taken which will permit accurate reproductions of the abutment teeth. If the impression is made of plaster the abutment teeth are packed with amalgam and dowels inserted. One should be careful to have all dowels parallel. Instead of amalgam, dialloy may be poured in all the teeth, care being taken not to allow it to flow over saddle areas if the cast is to be used for vulcanizing. When the case is vulcanized off the cast, as in the basing technique, it does not matter if the dialloy runs onto the saddle areas.

Incidentally, experience has shown it to be wise to preserve these models.

The remainder of the impression is poured in any hard plaster or stone.

2. The cast should be mounted on an articulator from which it may be removed. It is particularly awkward to adjust bar and clasps to a cast

when one has to work around the articulator or opposing cast.

Before any part of the appliance is constructed, the location of the bar and design of the clasp and lug rest, if used, are determined; consideration is given to the space between the opposing teeth and the ridge and the position of the teeth to be supplied to the ridge.

If a cast bar is to be made, a piece of 26 or 28-gauge wax is molded to the saddle areas to allow room for the vulcanite between the bucco-lingual rest and the ridge (Fig. 3). If a condensite is used and the laboratory desires a small saddle on the ridge to prevent displacement of bar and clasps during processing, one may dispense with this wax.

3. After the bar is waxed, a small, flat, narrow piece of wax is extended bucco-lingually over the ridges, one-fourth to three-eighths inch distal to the abutments, sufficiently long to form a rest to permit attachment of the clasp wires (Fig. 4). If desired, the lug rests may be waxed and cast as an integral part of the bar. This procedure simplifies the technique, maintains the bar in place when adjusting clasps, reduces the number of loose parts, preventing in this way possible displacement during investment and soldering, and shortens the laboratory time (Fig. 4). When vulcanite or condensite saddles are used it is always safer to make a unit of all metal parts by connecting all clasps and lugs with a metal bar of sufficient strength and rigidity.

4. If a stock lingual bar is used, one of proper size is selected and adjusted to place. To be sure to have it always in the same place during the following steps, some form of matrix is used. A simple method is to oil the middle two-thirds of the bar, wax it in place at the ends, then melt sticky wax beneath the oiled part of the bar and cast. After hardening, the ends are released and the bar easily removed, a wax matrix being left. This method is sufficiently definite if care is used; a more secure technique is to employ plaster instead of wax (Fig. 5).

5. With the bar in place a piece of clasp metal or flattened clasp wire is adjusted bucco-lingually to the bar

¹Gillet, H. W.: In Syllabus of Round Wire Clasp Course, School of Dental and Oral Surgery, Columbia University. Nagle, J. R.: Metallography Research Department, Harvard University Dental School. Crawford, W. C.: The Application of Recent Investigations at Columbia University Concerning Wrought Gold Alloys.

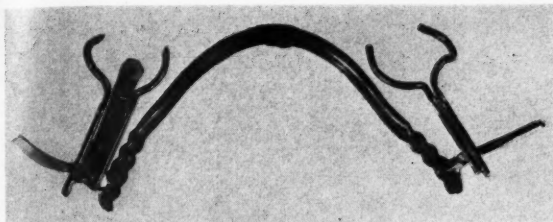


Fig. 1—Clasps designed to conform to the deductions from the laws of physics; i. e. (1) all wire clasps should be designed so as to be as long as possible; (2) whenever possible both flexure and torsional elasticity should be utilized in their design. The left side shows adjustment of upright and horizontal sections when a lug rest is used; the right side without a lug rest.

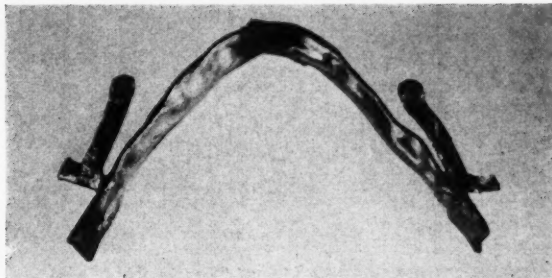


Fig. 4—Bar, lug rests, and bucco-lingual rests for attachment of clasp wires cast as a unit.

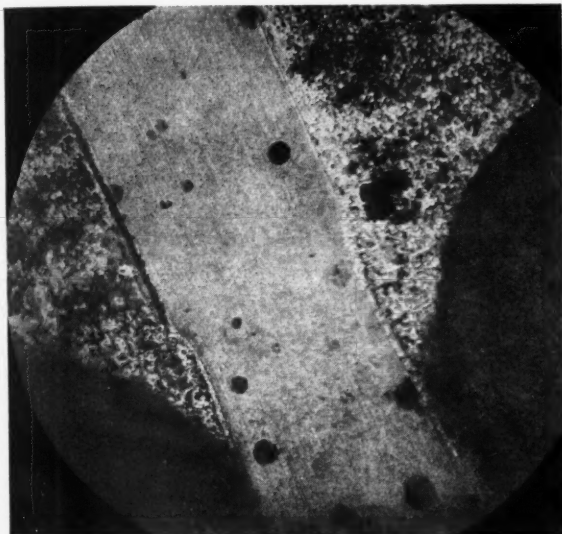


Fig. 2—Reduction in size by alloying or dissolving of the wire owing to prolonged soldering.

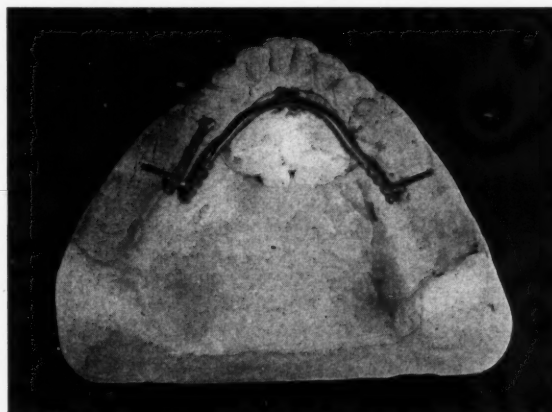


Fig. 5—The bar is held in place on the cast with plaster matrix during the subsequent process of adapting bucco-lingual rest, lugs, and clasp wires. Right side shows position of bucco-lingual rest; left side bucco-lingual rest and lug in position.



Fig. 3—Wax, 26 or 28 gauge, placed over the saddle area when a cast bar is used to leave room for the retention of the bar in the vulcanite or condensite.

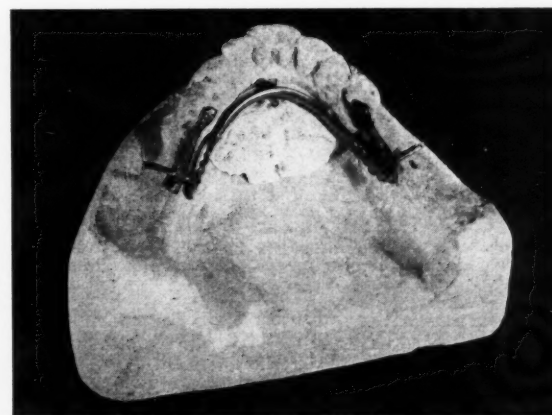


Fig. 6—If the lug is not soldered to bar as in Fig. 7, it is waxed heavily in place with sticky wax on one side only to prevent displacement during the process of adjusting the half clasp.

and ridge, similar to the wax rest in Fig. 4, and soldered with 18 karat solder. This rest should be much longer than the wax rest; the buccal end should be caught in the investment to prevent displacement during subsequent soldering (Fig. 5).

6. The bar is returned to the cast and seated in the matrix. In the

average case there is room enough between the ridges and the porcelain to place the lug and clasp wires over the ridge. In close bite cases a little forethought will suggest placing the lug and wires lingually to the center of the ridge. If cast lug rests are used they are waxed, cast, finished, and put in place on the cast (Fig. 5,

left). If clasp wire is used in place of cast lug rest, it is bent and adjusted to place. As the adjustment of the clasp wires is frequently apt to displace this lug, the lug should be heavily waxed with sticky wax on one side only (Fig. 6, right side). Much annoyance may be prevented by soldering lug rests at this time (Fig. 7).



Fig. 7—Bar with bucco-lingual rests and lug soldered in place.

Fig. 8—The assembled parts invested for soldering.

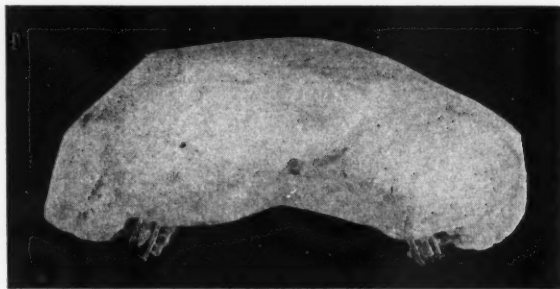


Fig. 8

For the sake of description, the clasps are divided into three sections: the arm, the upright, and the horizontal section. The arm is that section grasping the tooth; the upright and horizontal sections define themselves; they are adjusted parallel and in close contact to the lug rest when used (Fig. 1, left side). If the lug is not used, the upright and horizontal sections should be parallel and practically in contact with each other (Fig. 1, right side).

7. Having determined the position and shape of the clasps, a piece of high grade wire susceptible of heat treatment and of the proper gauge is selected. This wire should be sufficiently long to allow the fingers of one hand to act as the power to bend it around the beaks of round nose pliers. A beak with angles should never be used as it is apt to nick the wire.

The wire as it comes from the manufacturer is cold drawn and tempered and must be annealed to soften it. This is the point at which difficulty begins. With a bowl of water beside the flame the end of the wire is heated uniformly to a dull cherry red and plunged immediately into the water. Cherry red is 1300° F., but the light in which the wire is viewed alters the appearance of redness considerably; that is, a dark room makes the red wire appear redder; conversely, a bright room makes the wire appear darker, and often it is heated too much.

The dentist usually selects a wire by bending it over his thumb in the cold drawn state to test its resiliency and will not purchase a soft wire. This test is useless as all of the cold working temper is destroyed by annealing. It would be much better if the manufacturers were allowed to sell the wire in an annealed condition as they are equipped to perform this part of the technique much more uniformly than each individual laboratory.

8. After the wire is annealed one end is grasped firmly in the beaks of the pliers, where the bend is desired, but it is not grasped tightly

enough to dent it. With the other hand the wire is bent, the beak being used as a fulcrum. After the arm is formed, one should study carefully the angle necessary to bend for the upright. This is the most difficult bend of all to make so as to have both arm and upright where designed. Finally, with the last bend the horizontal section is formed to extend distally a little beyond the bucco-lingual rest. At this point the surplus wire is cut off and the clasp laid to one side. Frequent fittings are sometimes necessary; hence the reason for securely sticking the tang to the model if it is not soldered. Repeated bending hardens the wire and re-annealing should be done. It is also better to start a fresh piece of wire than to continue with the first one if much alteration of the bends is necessary.

Some modification of the conventional positioning of the clasp arm is

made feasible by the increased torsional and flexure possibilities of this design which also permits the use of a smaller gauge wire.

Having finished one half clasp the lug rest is securely fixed with sticky wax on that side and all wax is removed from the other side. The same procedure is now followed to form the second half clasp. When more than one abutment is used, the same process is continued with the others. After all clasps are made the bar and lug rests are removed from the cast and cleaned in acid with the clasp wire. All scraps of wax and débris are removed from the cast. The bar is replaced on the cast, and the lug rest and two half clasps for the proper abutment held in place and securely waxed to the bucco-lingual rest. One should be careful to leave the end of the rest free to be caught in the soldering investment. To permit free removal of the assembled

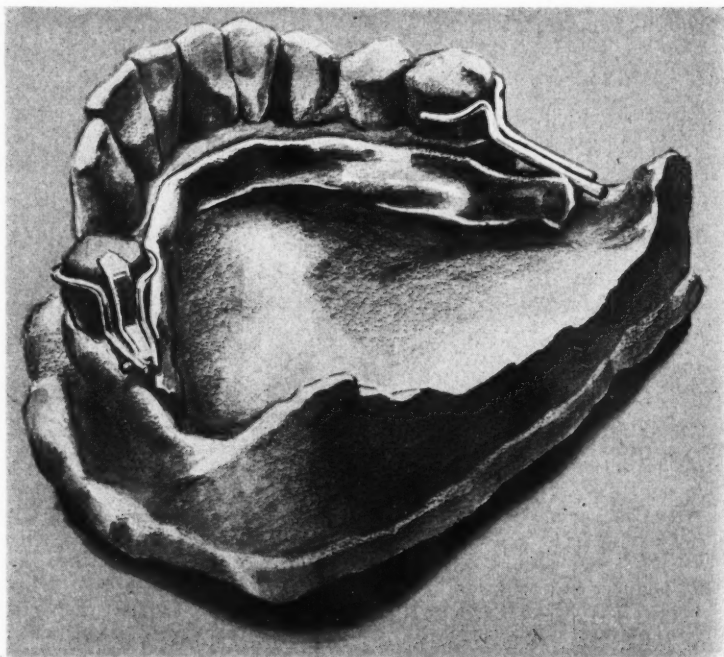


Fig. 9—Cast bar upon cast showing round wire clasps designed in accordance with principles exemplified in Fig. 1.

parts from the cast the clasp arms may be sprung apart and afterward readjusted.

When investing for soldering, all the bar, clasp wires, lug and buccal end of the rest are covered, the ends of the bar and the waxed parts being left exposed (Fig. 8). After the investment has set the wax is removed by boiling water. It is not necessary to preheat, but solder immediately and after a moment's cooling, quench.

HEAT TREATMENT

The question of heat treatment is a perplexing one. Of several different ways one is given here that may be done without extra equipment. Heat

treatment requires raising the temperature of the appliance, after annealing, to 890° F., slow cooling to 480° and then quick cooling to room temperature.

After the appliance is removed from the investment, it is cleaned in acid, laid on the block, the clasps are heated with a soft flame to a dull red and quenched. One side is done at a time. Now is the time to make all readjustments of the clasps to the teeth to prevent the need for any further bending or fitting when the completed denture is delivered and the ends of the clasp arms are finished. This adjustment may be done on the patient.

To heat treat, some loose asbestos is placed in the soldering block, heated thoroughly, the appliance placed on it, the clasps heated until the faintest bit of color shows, and then covered. It is impossible with a blow-pipe to heat the bar uniformly without overheating the clasps and this should not be tried. The hot asbestos fiber or soldering investment permits the slow cooling required and after a lapse of four or five minutes the appliance is removed and cooled quickly. After the appliance is cleaned in acid, it is returned to the cast and the process of making the denture is continued.

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THE EDITOR'S PAGE

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hygiene than on a basis of ovarian dysfunction or calcium drain.

3. The gingivitis of pregnancy, however, may be of an endocrine origin, because the condition has been reproduced experimentally by the injection with sex hormones in monkeys.

4. The employment of endocrine therapy in dentistry or orthodontia is scientifically unsound.

5. In the case of a patient in whom symptoms in the face or the oral cavity suggest an endocrine disturbance the dentist has both

a responsibility and an opportunity to refer the patient to a competent internist.

6. In summary:

Endocrine therapy has great possibilities for good in certain definite instances; but it also has great possibilities for harm when wrongly used. It must be pointed out that our knowledge of the function of the various organs from which extracts are obtained is limited and for the most part at an experimental stage. It must also be pointed out that our knowledge of the possible influence of the endocrines on dental disturbances is very limited. It would therefore be doubly dangerous to use a potent substance in relative darkness. While further advance in endocrine knowledge may eventually prove to be of great value to dentistry, our present limited knowledge does not warrant endocrine therapy in dentistry.

ABOUT OUR CONTRIBUTORS

FRED W. ALLEN has his D.M.D. from Harvard University Dental School. Doctor Allen has previously contributed to the dental literature. He is a member of the A.D.A., the American Academy of Dental Science, and is instructor in the Harvard University Dental School in the departments of operative dentistry and crown and bridge. Doctor Allen has a general practice.

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The biography of Weston A. Price, D.D.S., M.S., F.A.C.D., appeared in a previous issue of THE DENTAL DIGEST.

HARRY BERNARD WRIGHT received his D.D.S. from the University of Pennsylvania and in 1919 attended the Dewey School of Orthodontia. Doctor Wright's practice is limited to orthodontia on which subject he has written several articles for the dental literature. He is a member of the American (and New York) Society of Orthodontists, A.D.A., Philadelphia Clinic Club, American Academy of Stomatology, and is consultant on orthodontia for Shrine Hospital for Crippled Children.

SYPHILIS OF THE ORAL MUCOSA*

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SYPHILIS is the most important chronic infectious disease that presents clinical manifestations on the oral mucosa. This assertion is warranted (1) by its numerical prevalence; (2) by the fact that the mucous membrane may become involved during all its stages; (3) because during the secondary stage of syphilis, clinical manifestations on the oral mucous membrane occur in an overwhelming majority of instances; (4) on account of its infectious nature, bearing a special danger to the immediate family, to the physician, and to the dentist; (5) because its early recognition plays an important role in the likelihood of a cure, and (6) because in a fair number of patients it appears to act as a precursor of cancer of the tongue.

Syphilis is a chronic infectious disease caused by the *Treponemata pallida*, or the *Spirochaeta pallida*, which finds its way into the patient through some abrasion of the skin or the mucous membrane during intimate contact, sexual or otherwise, or during intra-uterine life. The disease may affect any or all organs of the body; it makes its presence known through a wide variety of symptoms and signs in which the oral mucous membrane is a frequent and significant location.

The orderly presentation of this disease is best accomplished if the classification is followed which was established by Ricord who divided syphilis arbitrarily into three stages. Although there are no hard and fast lines in this division, as one stage merges into the other imperceptibly, there is, by main and large, enough discernible difference for a clinical consideration.

HISTORY¹

Two theories are prevalent regarding the history of syphilis. One premise is that syphilis is an ancient disease and that its presence was noted even before the Biblical days. This history is written both by the human hand and by its own impress upon bones of skeletons which have been unearthed of an age determin-

able by archeologists. Both the written evidence of mankind and the impression of syphilis as left on bones are sufficiently indefinite to make it doubtful that syphilis, as such, was known to the civilized world before the latter part of the fifteenth century. This leads to the second hypothesis; namely, that the first contact of the civilized world with syphilis came through the medium of the sailors of Columbus in 1496 as they returned from the discovery of Central America. Historians believe that it was on the Island of Haiti that this infection first occurred, through the intermingling of Columbus' crew with the natives of this island. The dissemination of syphilis from there on becomes a matter of record in the form of epidemics which swept from the shores of the Mediterranean to adjacent and distant parts of Europe, and sixty years later, to Japan and China along the channels of travel of the traders and the sailors.

The proof of this second conception is more convincing when one takes into consideration the severity of the symptoms that were produced by this first apparent invasion of syphilis into the domestic life of the European nations. Both the course and severity of the symptoms showed that little or no immunity existed against this new scourge in the people who became infected. Later, as time went on and as decades went by, either through the attenuation of the *Treponemata pallida*, or through the increase of the resistance of the human body with the development of certain immune bodies, the picture of the disease changed and its severity lessened markedly, so that at present, except for the unusual instance, its manifestations are less dramatic.

The important figures in the history that follow 1496 are:

Hunter (1728-1793) who considered syphilis clearly as a venereal disease and described the so-called hard chancre.

Morgagni (1682-1771) who recognized syphilis of the viscera.

Von Swieten (1700-1772) who introduced the use of mercury therapeutically.

Wallace (1791-1837) who introduced the use of potassium iodide in the treatment of syphilis.

Ricord (1838-) who differentiated

syphilis from gonorrhea and divided it into the primary, secondary, and tertiary stages.

Hebra (1854) who revived the therapeutic use of mercury.

Hutchinson (1861) who described the characteristic notched, peg-shaped incisor teeth in congenital syphilis.

Fournier (1890) who brought order out of chaos in regard to the clinical conception of syphilis, especially congenital syphilis.

Metchnikoff (1903-1904) who demonstrated that higher apes can be inoculated with syphilis.

Schaudinn and Hoffman in 1905 established without any question of doubt, the identity of the *Treponemata pallida*, or the so-called *Spirochaeta pallida*, as the causative agent of syphilis.

The history of treatment reaches its height in 1910, when Paul Erlich introduced an organic arsenical compound by the name of 606 or Salvarsan (arsphenamine), which he and all the medical world believed to be a specific against this disease, but which later did not prove to be of nearly so great a value as the original experimenter believed it to be.

The name of Wassermann has become a by-word since the introduction of the complement fixation test as one of the diagnostic measures in 1909. We shall speak of this procedure at length somewhat later. The name of Noguchi stands out prominently among the recent investigators as the one who first obtained a pure culture of the treponemes. The prophylaxis against the disease is coupled with the name of Metchnikoff again, who was the successor to Pasteur both as the director of the institute erected to honor the discoverer of fermentation and also as a leader in new fields of scientific research.

As our knowledge stands at present, we must note and hold the treatment of the disease, syphilis, as an example of one of the outstanding achievements of medical endeavor. This statement is justified when the following is taken into consideration: (1) Its cause, the *Treponemata pallida*, is known. It is and has been successfully cultivated *in vitro* and *in vivo*. All of Koch's postulates have been fulfilled in recognizing the treponemes as the causative factor. (2) The mode of transmission is known;

*From the Pittsburgh Skin and Cancer Foundation.
1Garrison, F. H.: History of Medicine, Philadelphia, W. B. Saunders Company, 1922, pp. 181-184. Thompson, Lloyd: Syphilis, Philadelphia and New York, Lea and Febiger, 1920, pp. 17-22. Hazen, H. H.: Syphilis, St. Louis, C. V. Mosby Company, 1919, pp. 21-23. Stokes, J. F.: Modern Clinical Syphilology, Philadelphia, W. B. Saunders Company, p. 2-3.

(3) its varied symptomatology has been deciphered; (4) its treatment, both from the standpoint of prophylaxis, and after it has once been established, has met with excellent success, except for its later stages, when, either through the symbiosis of the human body and the treponemes or through some other manner which we do not understand at present, the complete eradication of the disease becomes uncertain; and (5) a complement fixation test is at our command which is able, in more than 60 per cent of the total cases, to confirm accurately by a precise laboratory procedure the existence of this virus in the patient.

DIAGNOSTIC PROCEDURES

In the description of the disease constant reference will be made to certain diagnostic procedures which will serve as corroboratory evidence for the presence or the absence of this disease, and for that reason, a brief description of these important methods of precision will be presented:

1. *The Direct Demonstration*—The direct demonstration of the organism is accomplished by the examination of the fluids obtained from the lesion itself. This fluid is collected on a cover slide, at times by abrading the lesion with a fine curet, at times by merely squeezing out with a gloved hand, the serum which the suggestive lesion contains. The cover slide is then placed on an ordinary glass slide used for microscopy, and then by the aid of an especially constructed light carrier on the stage of the microscope, which permits only a sliver of reflected strong light to penetrate through it, it is examined. The presence of *T. pallida* is demonstrated as a motile finely wavy, somewhat elongated, cork-screw-like organism.



Fig. 3—Chancre of the upper lip. Note the difference in the character of the covering membrane on the exposed and intra-oral part of the same lesion.



Fig. 1—Hard Chancre of the lip (Hunterian). Note the large size; Shay's demarcation; thick encrustation and duration beyond the margins of the ulcer.



Fig. 2—Chancre of the lower lip. This is the herpetiform variety of chancre. It resembles a "cold sore" and is a misleading form. Note also adenopathy.

This procedure is known as the *dark field* method of examination. It is an important laboratory procedure.

It is pertinent to mention here that there are organisms that resemble the *T. pallida* in its motility and mobility and in its cork-screw-like arrangement, especially in lesions found about the oral cavity. There are two in particular that might confuse the observer: The *Spirillum* of Vincent and the *Spirochaeta microdonta*. Familiarity with these other spirochetes is necessary for proper interpretation of the observations.

The differentiation between the *T. pallida* and the other spirochetes depends on the following characteristics of the *Treponemata pallida*: (1) the length of the treponeme is

from 8 to 20 microns; (2) it is finely thin; (3) it possesses a light-reflecting ability, and (4) it is a rapidly motile organism, having a cork-screw and a



Fig. 4—Chancre of the lower lip. Note the regional adenopathy. (Courtesy of Doctor Howard Fox of New York.)

CHARACTERISTICS OF THE VARIOUS SPIRILLA

| NAME | LENGTH | WIDTH | NUMBER OF SPIRALS | MOTILITY | STAINING QUALITIES | MISCELLANEOUS |
|---|------------------------------------|-------------------------------------|--|--|--|--|
| <i>Treponemata pallida</i> | 4 μ - 20 μ | $\frac{1}{4}\mu$ - $\frac{1}{2}\mu$ | 3-12 spirals regular in outline or may reach as high as 40 | Forward and backward Corkscrew or spiral Wavy from side to side Fine flagellum at one end | Stains red with Giemsa stain | Is regular in outline and may be cultivated by planting on agar with ascitic fluid under anaerobic conditions |
| <i>Spironema refringens</i> | 10 μ - 30 μ | $\frac{1}{2}\mu$ - $\frac{3}{4}\mu$ | 3-15 flat spirals | Movements are more rapid and it has the ability to change its form while in motion | Stains blue to blue violet with Giemsa stain | Is normally found in smegma but occasionally found in the oral cavity as a secondary invader |
| <i>Spironema buccalis</i> | 10 μ - 20 μ | $\frac{1}{3}\mu$ - $\frac{2}{3}\mu$ | Elongated and irregular | Movements are very rapid | Violet with Giemsa | Found in the mucus about the pharynx and tonsil |
| <i>Spironema dentium</i> <i>Treponema microdenteum</i> | 4 μ - 12 μ | $\frac{1}{8}\mu$ - $\frac{1}{4}\mu$ | Regular in outline. Average 14 | Rotation in its long axis. Has no flexure movements | Deep blue with Giemsa and with Löffler's flagella stain | Found about carious teeth in mild infections of the oral cavity |
| <i>Treponema macrodenteum</i> | Much larger 8 μ | Coarser | Fewer regular spirals 2-8 curves | | Intensely blue with Giemsa and only red in poorly prepared specimens | |
| <i>Spironema vincentii</i> | Much longer 10 μ - 20 μ | Coarser | 3-5 irregular spirals | More actively motile | Does not stain with Gram's method | Similar to <i>S. macrodenteum</i> . Always found along with <i>B. fusiformis</i> . Pointed ends swollen in middle. |



Fig. 5—Chancre of the upper lip. Note in addition to the primary lesion, the glandular swelling on the same side of the neck, the spots seen on the body show the beginning macular eruption, a secondary manifestation of syphilis.

wavy, undulatory motion. The other organisms are usually larger, thicker, less wavy, less motile, and much more abundant in smears obtained from the mouth.

There is another form of direct demonstration used chiefly to find the *T. pallida* within the tissues. The reference here is made to the special staining method, impregnation of organisms by a special stain, but as this is of less practical value and much more technical in nature, its description will be omitted.

2. *The Indirect Method*—The indirect method of demonstrating the presence of *T. pallida* is accomplished by the examination of the blood serum or the cerebro-spinal fluid. Two types of tests form the basis for this

procedure: (a) the complement fixation test and (b) the precipitation test.

3. *Local Tests*—The local tests are discussed later.

THE WASSERMANN REACTION²

The blood serum reaction to the Wassermann test consists of a modification of the original Bourdet complement deviation. The principle of the reaction depends on the presence in the blood of a substance that owes its origin either to the activity of the *Treponemata pallida* or to the disintegrated tissue products produced through the action of the *T. pallida*.

²Goadby, Kenneth: Diseases of the Gums and Oral Mucous Membrane, London, Humphrey Milford, Oxford University Press, 1928, pp. 175-176.

This substance is able to prevent the attachment of a hemolytic serum to the appropriate red cells, thereby preventing lysis or disintegration of the red cells by the hemolytic serum. In order to perform the test it is necessary to have the serum of an animal that has been immunized to some form of red cells. This serum when mixed with an appropriate quantity of the red cells to which the animal has been immunized breaks it up and produces hemolysis. When such a serum is heated to 50° C. it loses its power of attachment to the red cells and no hemolysis takes place. If, however, a small amount of serum of a normal animal is added to such heated or inactivated serum, hemolysis is found to occur. Such a mixture—heated immune serum, red blood corpuscles, and complement—is known as the hemolytic system. If the blood of a syphilitic patient is added to the system, the syphilitic serum is found to contain a substance that absorbs the complement or activating portion in the hemolytic system, and therefore no hemolysis takes place.

THE KAHN REACTION³

The Kahn test depends on the precipitation of a protein fraction of the serum of syphilitic patients by an antigenic solution, prepared by methods that resemble those used in making antigens employed in the Wassermann test. The reaction is read direct, without the intervention of a hemolytic system, by observing the presence, amount, and character of the precipitation or flocculation of the protein fraction involved.

Both the complement fixation and the precipitation tests have an added usefulness in primary lesions (chancres) occurring about the mouth. As has been noted while discussing *dark field* procedures, there are several varieties of spirochetes in the mouth, with sufficient resemblance to the *Treponemata pallida* to cause a great deal of difficulty in proper differentiation. It has been found that serum obtained from a chancre will give positive results to the complement and precipitation tests long before these become positive in the blood obtained from a distant vein. This procedure is known as the local Wassermann or the local Kahn or the local Kline test. By scarification and gentle massage, a minute quantity of blood or serum is sucked up into a pipe and any one of the three tests may then be carried out. Next to the direct demonstration of the organism by the dark field method, the application of one of these *local tests* becomes of important diagnostic help.

³Footnote 1, fourth reference, page 97.



Fig. 6—Chancre of the tongue. Note tumefaction, rapid in its development; the lack of ulceration; the surrounding induration, and the submental glandular enlargement. (Courtesy of Doctor Howard Fox of New York.)



Fig. 11—Granuloma pyogenicum. Note a small, indolent, hemorrhagic tumefaction (infected proud flesh); collarette arrangement of epidermis surrounds the lesion. There are no glandular enlargements or other associated symptoms.



Fig. 7—Leukoplakia labialis showing ulceration with early necrosis. Slow development is one of the differentiating features from a chancre.



Fig. 9—Chancre of the lower lip. Note unusual character resembling hypertrophic granulation tissue. The question of carcinoma was very pertinent on account of the age of the patient. The lesion, however, lacked the usual "hardness" of cancer.



Fig. 8—Chancre of the tonsil.

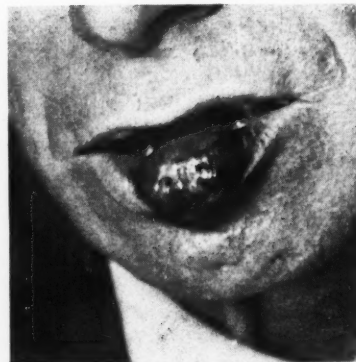


Fig. 10—Carcinoma of the lower lip.

INTERPRETATION OF THE LABORATORY PROCEDURES

There is only one point which needs elucidation, and that concerns itself with the understanding that the application of these methods of precision will yield positive results only in certain stages of the disease. Direct demonstration by the dark field is applicable to the primary, and at most times early secondary lesions, the latter in the oral mucosa principally. The application of the local precipitation test is again practical, especially in these early lesions.

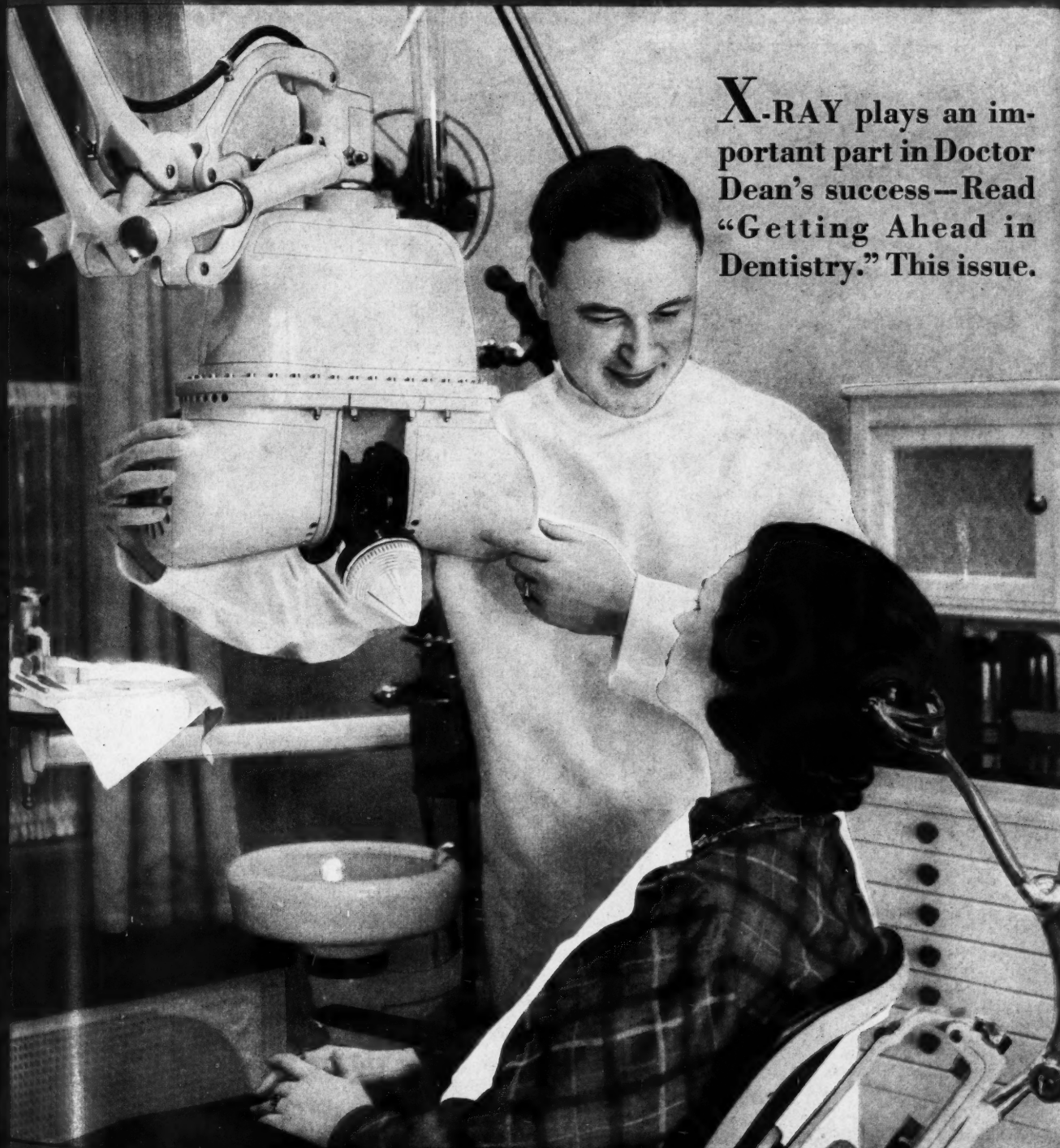
Complement fixation and precipitation tests will generally be found negative in the early stages, practically 100 per cent positive in the secondary stages, and they will be found positive in from 40 to 60 per cent of cases in the latent and tertiary stages of the disease.

None of these tests, of course, is infallible. Peculiarity of the individual or peculiarity perhaps of the treponemes, determines whether these confirmatory laboratory tests will coincide or not with the clinical diagnosis. It is important to understand that these procedures are to be used merely for corroboration, merely as a link in the chain of evidence, and that the diagnosis of syphilis is possible in spite of negative laboratory observations.

Shortly after the generalized dissemination of the *T. pallida*, or later on in its course of symbiosis in the body, the cerebro-spinal nerv-

(Continued on page 103)

Ritter COUNSELOR



X-RAY plays an important part in Doctor Dean's success—Read "Getting Ahead in Dentistry." This issue.

COLOR *takes its place in the* PROFESSIONAL WORLD

DURING the last decade the American people have become color conscious. They have broken away from the traditional drab colors of the past and have cast their vote for warm, cheerful, lively tones and shades. Naturally, manufacturers, retailers, architects, designers and stylists have catered to the growing public acceptance of color.

Such widely dissimilar things as stoves, automobiles, skyscrapers and plumbing fixtures are now liberally adorned with color. Even conservative automotive manufacturers who for a time refused to make use of color, have had to give in and satisfy America's demand for color.

Psychologists tell us that the many races which make America the melting pot of the world have developed into a distinct national type. This type is entirely different in its thinking processes from the Puritan Fathers and early pioneers. Americans today are more volatile. We think more quickly. We act with more alertness and like all people of this type, we are strongly influenced by color. We want brighter tones and are no longer satisfied with drab grays, dull blues and glaring stark white. We appreciate color and understand it—and realize that color like sound has a definite effect on the senses. We know that yellow, buff and ivory promote cheerfulness. That green is quiet and peaceful, pale blue cool and tranquil, dark blue depressing and red irritating and exciting. We have this knowledge and we apply it in decorating our homes, stores and offices with colors that are soft and quiet—yet at the same time stimulating and pleasing.

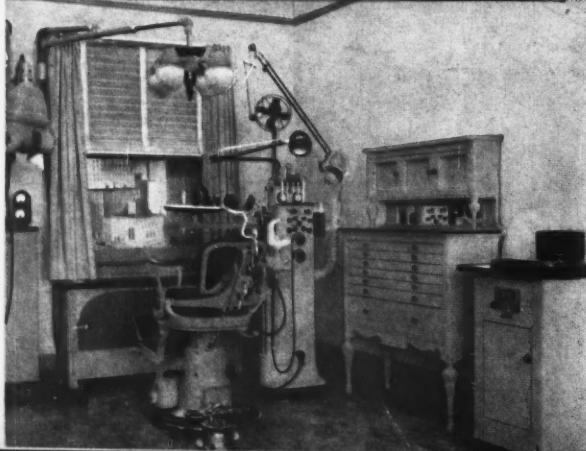
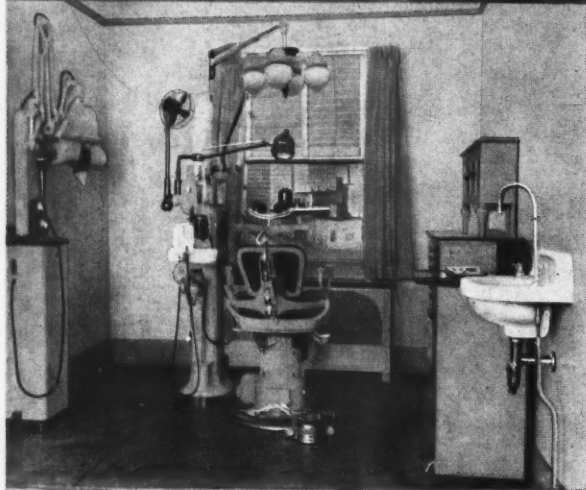
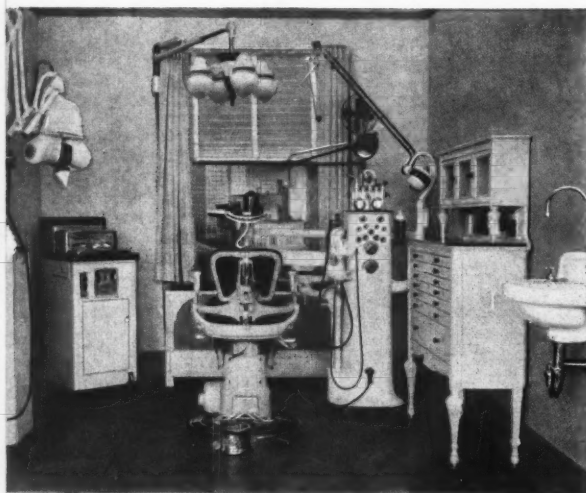
Even hospitals, which were formerly synonymous with glaring stark white enamel, are now adopting softly tinted walls, equipment and furniture. Patients find it more cheerful, more restful and a definite stimulus to convalescence.

The dental profession as a whole has not fully recognized the possibilities of color in offices and equipment. Even today a large percentage of dentists are partial to equipment finished in standard mahogany or black finishes. Those who prefer the darker finishes point out that such finishes create an atmosphere of solidity and professional dignity.

There are, however, thousands of dentists all over the world who have found that equipment in color is more appealing to their patients and helps place them in a more receptive frame of mind toward the dentist and his operating procedure.

Because color was relatively slow in gaining a foothold in the dental profession, equipment in color until recently was manufactured only "to order" instead of being included in regular production and it was necessary to charge extra for equipment finished in modern color because of limited sale. However, with improved business conditions throughout the land and orders for equipment in color having greatly increased, the Ritter Company is now able to manufacture equipment in color for the same price as that charged for the traditional mahogany or black finishes. An announcement to that effect was made on January 1st and was greeted with widespread enthusiasm. It was clearly evident that an increasing number of dentists in every part of the world had been converted to color in professional offices. Ritter offers its congratulations and foresees for them a bountiful increase in patient confidence and approval, resulting in individual success.

Just as the American public has welcomed color in every commodity, every useful article, in homes, office buildings and automobiles, so will they welcome the presence of color in the dental office. The cheerful, pleasing effect of Ritter Soft White, Ivory Tan, Neptune Green, or Mother of Pearl Gray equipment against a harmonizing background must inevitably react favorably on patient's nerves and upon their willingness to visit their dentist at more regular intervals. Again industry has shown the way to increased business. The professions are following that lead to gain and retain public confidence. Hail to color in the dental office!



Ritter COUNSELOR

"WISHING" EQUIPMENT

How Doctor Hollingsworth Set a Dental Student on the Right Path to Success . . .

MISS RICE, the nurse, came into Dr. Hollingsworth's laboratory. "There is a Mr. Blake to see you, Doctor. He said not to disturb you if you were busy."

Dr. Hollingsworth arose to his feet from his laboratory stool. "Send him in, Miss Rice, send him in."

Hollingsworth went to the door himself and called "Come in, Harry, come right in!"

"Thanks, Bill. It's nice of you to see me during office hours."

"Okay, Harry. I have just completed a bridge case and a little relaxation will do me some good. Glad to see you any time. Sit down here, and tell me how things are going at school. Everything all right?"

"Things are fine, Bill. My marks are good and I am all interested in Dentistry now. This is my last year, you know, and I expect to graduate in June."

"Say, that's great! Boy, I can hardly believe you will be one of us! Welcome to our Profession! I suppose you are coming back here to the old home town and give all of us 'old timers' some real competition," laughed Dr. Hollingsworth.

"You know it! But seriously, Bill, I need advice and I would appreciate it immensely if you would give me some tips about getting started. I only have a few months left to make my final plans—and I want to be all set to start practice after I graduate and pass the Board examinations."

"I'll be delighted to help you any way I can, Harry. My four years of practice have given me a practical slant on things and I'll get a great kick out of passing along to you any information that may be available. What's the burning question of the moment?"

"It's getting started and selecting equipment. Dad promised me in 1930 when I started my course to stake me

when I set up, but he can't lend me as much money as anticipated then, because his business is increasing so rapidly that it is taking most of his ready cash to finance it. Tell me, Bill, what do you think about setting up here and buying some—what do you call it—'distress' equipment?"

"Harry, you belong here where you have many friends, and I'm going to wish you God Speed, but that question about 'distress' equipment can be the biggest mistake you could possibly make. I made it—and I suppose it's the commonest one made by young dentists about to enter private practice."

"What do you mean, Bill? It seems to me it's the most sensible way of outfitting my office. It certainly wouldn't cost as much as buying new equipment."

"Harry, that's just where you're wrong. *In the long run distress merchandise of any kind costs more.* Let me tell you why I say that. When I graduated in '30 things looked pretty black to me and I had only about one-half the money I had been counting on to buy my equipment. That meant I had to cut corners wherever I could and save every possible penny, so I started out to find some 'distress' equipment. I was able to pick up an outfit to fill my rooms, and thought I was pretty clever to figure out a way to get started without spending too much money at the outset. Well, I felt good about my judgment of equipment selection until its installation. Then my eyes were opened and I began to kick myself all over the place because it looked like a misfit when I got it all together and set up for operation. No two pieces were of the same manufacture, or match in color. They were all supposed to be the same Mahogany, and on an offhand inspection you'd say they were, but when you saw them side by side you could see the glaring difference. One piece had a natural appearance of Mahogany in hand-



"This is my last year, you know, and I expect to graduate in June."

graining and another a very poor imitation. Harry, I found that I had outfitted my office with 'wishing' equipment."

"'Wishing' equipment, what do you mean?"

"Just this, I started wishing I hadn't bought it the day it was installed in my office. I wished that I had installed every piece of equipment of one manufacture—and that I had bought *everything* new. You see all the equipment I bought—with the exception of the Ritter X-Ray Unit, which was new—had been turned in on a new equipment purchase by some dentist who realized that modern up-to-date equipment, in color, created a better atmosphere. The equipment I installed didn't give my office the dignity and respect I desired, and it handicapped me in getting started. I was further discouraged because I lost my first patient and I really believe that misfit equipment had a good deal to do with it—but it took my Aunt Maude, who staked me in my initial start, to 'show me the light.' One day shortly after I began practice, she said to me 'Billy, if I didn't know you had just graduated and were a young man, I'd say this office is occupied by a dentist who hasn't kept up-to-date' and added, my office gave her the 'jitters'. She said to judge by appearances I had been in practice for a good many years and that I hadn't been particularly successful. Naturally, this made me wish more than ever that I had bought all *new* equipment. I became firmly convinced that my 'wishing' equipment was a definite handicap to my professional success and would remain as such just as long as I retained it.

"Last year Aunt Maude died and in her will she left me a fair nest egg with

(Continued on page 103)

Getting Ahead in Dentistry

JOE HURLEY slid out of the operating chair he had been sitting in and stretched, "Well, boys, here it is nine-thirty. We've made a good evening of it and I guess that takes care of our next dental meeting program," he said.

The other three members of the Program Committee agreed. Ed Taylor, the youngest in the group, said, "Yes, that takes care of the clinical part of the program—but what I would like to see added is a subject devoted to defining success. I hardly—"

"I can define success for you, Ed—a million dollars in your own name!" interrupted Dr. Standish, the eldest of the four dentists. All of them laughed with the exception of young Taylor.

"Maybe that is real success," Taylor continued seriously, "but somehow I rather doubt it. Now all of us here are fairly successful. We have nice practices, make a good living and provide limited enjoyment and happiness for our families, but are we making the most of our opportunities? Dentistry, as you know, has accumulated in the mouths of a vast number of people through the lean years just past."

"It's a very interesting subject, Ed," said Dr. Dean, in whose office the meeting was being held. "It's our individual problem and each of us can overcome the obstacles in the path to greater success. What do you think, Stan—are we making the most of our opportunities to get ahead in dentistry?"

"I think so," replied Dr. Standish. "I'm pretty sure I am anyhow. At any rate I am making use of things I never would even have thought of a few years ago. Visual education, for example. I defy anyone to show me a better way of educating patients to the importance of preventive dentistry. Formerly I spent an untold amount of time trying to convince my patients that they needed certain restorative dentistry and that delay might prove extremely dangerous—even then I frequently missed the mark. Now all I have to do is show them the educational films and let them speak for themselves, *convincingly*. This principle of lay education has shortened the time in giving each patient a health talk and therefore I can accommodate more appointments."

Joe whistled. "Gee, that's great, Stan. Will you fellows let me do a little success broadcasting?"

"Go ahead," said the other three as if in one voice.

"You know I was plugging along a while ago with a well filled appointment

book—but a very slim income. I had been working from radiographs taken in an X-ray laboratory, which my patients brought to me for diagnosis. Well, one day Art Morrison of the Bidwell Dental Supply Co. came in while I was surveying a few radiographs and said, 'Doctor, why should you work from other men's X-rays? Why should you pass up fees for X-ray examinations? Or—why shouldn't you X-ray every patient's teeth here in your own office and absorb the small cost in the hidden dental work that these X-rays will uncover? A check-up on the cases you refer to an X-ray laboratory for X-ray service will prove that every patient does not return to your office for the needed dentistry. Many of them go shopping and you lose the case—because they feel under no obligation to you.'

"Art was right. I lost one case that I know of—it was one of those types of accumulated dentistry in the mouth of a man whom you all know—and he could well afford a complete reconstruction. It left me like it had wings and the case would have more than covered the initial payment on an X-ray Unit. Art convinced me, and I had him install one of those new Ritter Model "B" X-Ray Units—and is it flexible and shock-proof! And what results! Buying it has proved to be the most profitable investment I have ever made. It really enables me to complete my service to my patients. It's already uncovered more than enough additional work to complete the balance of the payments on this investment in advance."

Dr. Dean turned to Ed Taylor as Hurley signed off. "Ed," he asked, "what are you doing to make your practice more successful? You're the youngest of the lot but you're certainly going right ahead."

"I'll tell you, Charley," answered Taylor. "I've carried out the ideas of Stan and Joe, thanks to my membership in our society which has made it possible to become closely affiliated with you fellows, and I've learned a lot from you during my three short years in practice. I've gone what I consider a step farther than Stan or Joe. When I set up for business I heeded advice and modernized my office from front to back. By that I mean I not only invested in complete modern Ritter equipment, but also installed it in what might be called a modern way. My patients tell me it's so attractive and comfortable they really enjoy keeping their appointments with me . . . Now, Charley, you've been

sitting here in your own office asking us questions which we have discussed freely about this all-important question of getting ahead in dentistry. Why don't you



"In addition to the usual patient data, I also re..."

tell us what you've done. I would say—and I think the boys here will agree with me—that you are one of—if not the most successful dentist in town."

"It's nice of you to say that, Ed," responded Dr. Dean, "and I'll be glad to tell you what I have done. It's really quite simple. First, I pride myself on having good equipment, operating instruments and quality materials as an aid to obtaining the best results in my work. My nurse keeps this place spic and span. She is proficient in her work, not only at the chair, but in the laboratory as well, and my books are always in balance. She is the watchdog over the details which I don't have time for. And my hygienist keeps herself well occupied at the chair, as the patient call list is kept up to the minute and she maintains a constant flow of prophylactic

THE DENTAL DIGEST

cases. Like Stan and you, Ed, I use visual means for patient education, but I supplement them with health talks, to each and every patient, the use of models and the Clark Chart. However, the greatest help I have yet discovered for impressing patients with the vital necessity for X-ray examination is a couple of colored illustrations I ran across in one issue of the Dental Digest. I was so forcibly impressed that I clipped them out. Here they are, right

and finds that: (A-2) the gold inlay is 'leaking'; (B-2) the pulp is diseased; (C-2) the inflamed gums represent a pyorrhea pocket; (D-2) the 'dark spot' is a deep undermined cavity; (E-2) an impacted third molar, and (F-2) infection at the root ends of a first molar tooth.

"Obviously, any patient immediately reaches the correct conclusion that a thorough dental examination and accurate diagnosis are possible only with X-ray examination. These simple illustrations and a brief discussion in a pleasant, ordinary tone of voice, in the language of the laity, have convinced even those few 'die-hard' patients who hitherto refused to consider X-ray, that they owed it to themselves to have their teeth X-rayed. Most people today have at least a partial realization of the important role dentistry plays in keeping their entire body healthy.

"Boy, that's a peach of an idea," Hurley burst out. "I wish you'd have your nurse look up the issue of the Digest those illustrations came from and let me know. I'm going to frame them!"

"I'm coming to your part now, Joe," Dr. Dean went on. "We dentists cannot hope to attain real success until we have a full understanding of our moral responsibilities to our patients from the standpoint of 'mouth health.' We must stop doing 'patch-work' dentistry and limiting our examination upon a patient's first visit to mere visual means with mouth mirror and explorer. We must use every scientific means in our reach to make a complete and proper diagnosis. I mean we must use, besides the mouth mirror and explorer, the X-ray, transillumination and the pulp vitality tester.

"Then, too, it's a good plan to obtain a history of the patient's condition and the name of the family physician—this information to be recorded in addition to the patient's name, address, telephone number, references and business.

"If we have done our part in educating the public to the necessity of *real* preventive dentistry, we can proceed with taking a radiographic survey of a patient's mouth on the first visit. Then we can make an early return appointment. On the return call, we are able, thanks to our radiographs, not only to 'tell,' but to 'show' the patient the exact conditions existing.

"With the patient seated in the operating chair, I attach the complete mounted X-ray films to my Dualite, so that they are in full view of the patient and myself. This makes it possible to readily refer to the radiographs during operations—and, too, patients quickly sense that you are actually making use of the X-ray findings in the performance of your work, which of course is not only good psychology, but evidence of thorough procedure.

"This might be called part of my patient educational system, but it also goes a little farther." Dr. Dean rose and went to his desk. He returned to the other three carrying a letter. "After making our full mouth X-ray survey of a patient's mouth, I send this letter to the family physician." He read:

"Dear Doctor:

Mrs. received a dental examination by me on and has informed me that you are her physician.

There is on file in this office a complete record of the examination, together with the X-rays. I shall be glad to furnish same upon request and to counsel with you.

Yours very truly,"

"This cannot help but impress the physician with the fact that I am up-to-date, and has often resulted in physicians referring other patients to me.

"And now we come to another phase of modernizing the dental office. Come over here." Dr. Dean led the way through his business office and opened a door adjacent to the one leading to his main operatory. He switched on the light and said, "This is my children's department." The three men looked in at an attractive room furnished with Ritter Junior Equipment, and in which everything was skillfully planned to attract and interest children.

"I know," said Dr. Dean, "just what all of you are thinking, and that is—'why in the world does he need kiddies in his practice?' You remember Dr. Carter who practiced in this town for forty-two years and dropped out of actual practice two years ago? Well, I overheard a conversation down in the bank one day which stunned me. The cashier of the bank was asking a depositor what had happened to Dr. Carter, and the reply was, 'Poor eyesight, and most of his patients were in the cemetery anyway.'

"That convinced me. I did a little thinking and some investigating, and what you see here is the result of the conversation overheard in the bank. I feel that my children's department is one of the most important phases of my practice," Dr. Dean said. "I not only enjoy working with children—I consider them a definite investment in my future. I use a definite plan for educating them in the value of mouth health and care. As they grow up they will replenish my practice and more and more replace some of my present patients who will eventually become 'cemetery patients.'

"Then, too, children are often instrumental in bringing their parents to me. If you succeed in winning and holding a child's confidence and interest, he usually becomes a splendid press agent for you and never fails to put in a good word at home for you and your work."

(Continued on page 103)



no record case history and the name of the family physician."

in my cabinet." As he produced the illustrations the other men clustered around him. (See page 103).

"You see how clearly these two illustrations (Figs. 1 and 2) point out the difference between what a dentist can see with ordinary visual methods of examination, contrasted with a radiographic survey. Notice how aptly they differentiate between the external or 'eye' view of the teeth and the internal or 'X-ray' view.

"And let me read the descriptive matter to you. 'By *visual* examination alone a dentist sees about *one third* of the *total dental structures*. In this case he sees: (A-1) a gold inlay that appears normal; (B-1) an inflamed area; (C-1) a suspected dark spot on a tooth.'

"By *Roentgenographic* examination a dentist sees the entire dental structures

You can't DIAGNOSE what you can't SEE!

Before a dental radiograph can be intelligently interpreted, it must contain all the qualities of radiographic registration which are obtainable only by proper control of the complex physical process involved in the production of X-rays or radiant energy. When this process is complete in every respect and is combined with correct principles of a standardized technique, the resulting radiograph is one which the dentist recognizes as being authentic.

An accurate diagnosis can then be made with the resulting radiographic evidence added to the symptoms and case history of the patient. Nothing remains hidden or mysterious. This is plainly shown by a comparison of the radiograph in Figure 3 with those in Figures 1 and 2.

Nor is there anything hidden and mysterious about the vital elements of the Ritter Model "B" X-Ray Unit which insure unfailing accuracy in the production of the visible end result—"the registration of the differences in densities of bone and tissue." An authentic radiograph is dependent upon the standardization of all exposure factors. The most important of these are the ones which result from the correct electrical principle embodied in this newly designed shock-proof X-Ray Unit.

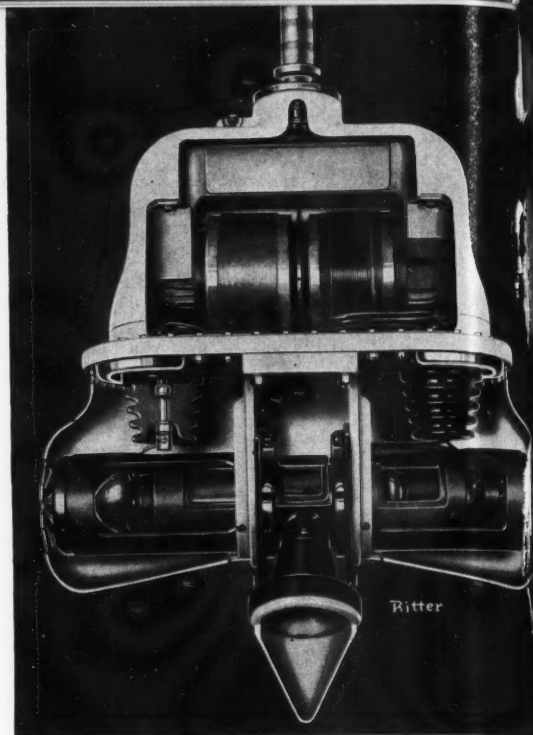
A fixed factor of ample penetration is assured from the abundant physical dimensions which make up the high tension transformer. It is located in the upper compartment of the head and is completely immersed in oil. This power plant represents the heart of the X-Ray Unit and is rated at 63 K.V.P. transmitting 45,000 volts to the X-Ray Tube, which is equal to a 3" spark gap.

The tube is readily accessible in a separate compartment but not immersed in oil, permitting rapid cooling by air. This results in the maintenance of a consistently high degree of normal operating efficiency and appreciably prolongs the life of the tube. The Ritter

X-Ray Tube is cylindrical in shape and rotates on its horizontal axis at the touch of a finger on the pointed cone, permitting the concentrated beam of central rays from the line focus target to be directed and recorded at a predetermined and fixed angle. Complete absence of a cradle supporting yoke for the head allows perfect freedom and ease of manipulation without disturbing the fixed angulation. With the target surface of the anode placed at a newly developed angle of 20°, this tube converts more available electrical energy into useful X-rays than in the old style right angle tube. This new tube maintains a constant output of X-ray energy which is recorded on the milliamperemeter when the factor of voltage or penetration has been set by the fine control of the Ritter auto-transformer. All high tension terminals are concealed, assuring absolute safety to patient and operator.

An X-Ray Unit is no better than the radiographs it produces. Unless it provides uniform detail in all films, it is impossible for any dentist to diagnose a case with complete accuracy. A radiograph which is too light or too dark inevitably fails to disclose certain pathological conditions. Figure 3 demonstrates how a Ritter made radiograph enables the practitioner to differentiate between normal anatomical landmarks and pathologic conditions by recording abundant detail of the density and texture of the entire tooth anatomy and its surrounding cancellated structures. Deviations from the normal are clearly shown when the radiograph is properly exposed under the influence of radiant energy produced by the soundest type of engineering construction in dental X-Ray Unit equipment.

When the Ritter Standardized Technique is followed, every radiograph has the clearness and definition absolutely



Perfectly balanced at the end of an extendible bracket this powerful X-ray generating unit can be adjusted to any operating position with a touch of the fingers. It is shock-proof because all the electrical elements shown in the cut-away section are completely enclosed. Here the vital elements revealed.

necessary for accurate diagnosis, regardless of varying tissue and bone density and structural differences.

There are no variables in the Ritter Model "B" X-Ray Unit. Every factor essential to taking uniform radiographs is predetermined and fixed. Correct voltage and milliamperage are predetermined without lighting the filament of the tube, thereby eliminating the necessity for test exposures.

The voltage regulator is of the auto-transformer type which permits compensating for any line voltage. Its finer adjustment and range of 20 volts are ample to accurately correct any line voltage change which might occur. The actual current in milliamperage passing through the tube to produce the desired amount of X-ray radiation is automatically established by setting the voltage regulator.

Uniform distance is obtained, regardless of focal angle, by placing the cone in direct contact with the patient's face.

All rays are practically parallel within close proximity to the apex of the cone. This permits them to be projected through the apices of the teeth in accordance with the established technique.

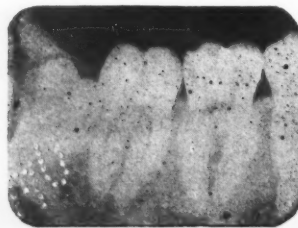
Exposures of precisely the proper duration from 1 to 12 seconds calibrated in quarter second intervals are insured by an automatic time switch.

The new Ritter Model "B" Shock-proof X-Ray Unit leaves nothing to chance. Ritter engineers know that a dentist can't diagnose what he can't see—so they have designed an X-Ray Unit with every scientific safeguard for producing uniformly excellent and authentic results.

Fig. 1

Fig. 2

Fig. 3



"Wishing" Equipment

(Continued from page 97)

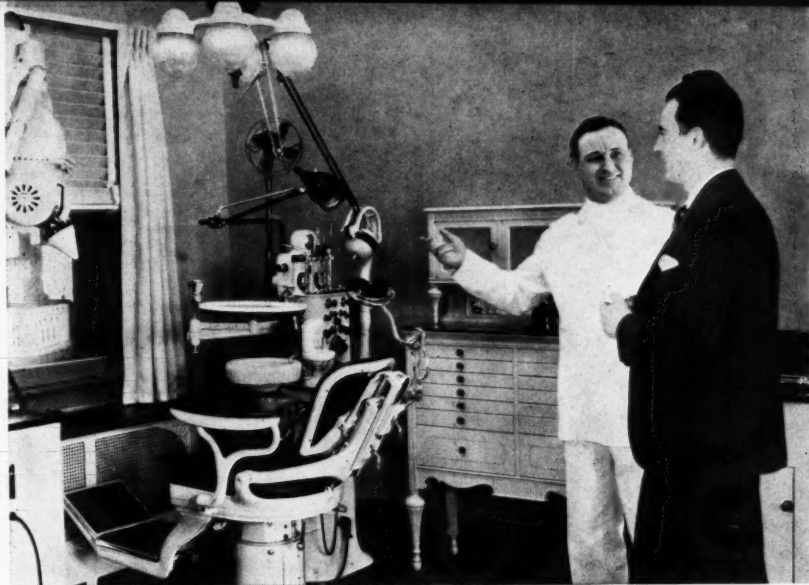
a proviso that I use the funds only in promoting my success in Dentistry. In the wake of things I dreamed of my future and its success and finally decided to consult with Mr. Pierce of Hopkins and Spencer Co., my dental dealer, who had helped me in the trying days, and I put my case squarely up to him. I told him I was afraid I had made a big mistake at the very start of my practice, and now had an opportunity to correct it before it was too late. Mr. Pierce arranged for an interview with me in my offices to look over the situation. He pointed out that my office created an atmosphere of coldness and bleakness because of no consideration to the fundamentals of environment. He suggested warming up the place with cheerful colors; a change here and there; redecorating the walls fitting to the exposure and color of equipment. Pierce explained that new Ritter Equipment in the more adaptable colors to fit my requirements cost no more than ordinary finishes—well, Harry, here's the result. Take a look at my main operator."

"Gee, Bill, it's certainly a fine looking office, and one I'd like to have, but I couldn't begin to pay for all of this fine equipment."

"What do you mean—you couldn't pay for it? Nonsense! Profit by my experience, Harry—don't be foolish. It's not necessary for you to put up with 'wishing' equipment, or anything cheaply designed. You can make your wishes come true now and never wish for anything different than the best."

"That's all well and good, Bill. But you had an aunt who made it possible for you to invest in this beautiful, new, office."

"Hold on Harry, I still have the floor. My next patient is due in ten minutes, but in the meantime I want to tell you something you will appreciate. The money my Aunt Maude left me is still intact. In fact, it's now in trust for a future generation of my kinspeople. It was not necessary for me to



"Well, Harry, here's the result. Take a look at my main operator."

use any part of that money because Mr. Pierce showed me a plan that enabled me to carry on without any help from the money left by Aunt Maude. Harry, do you know why I am so interested in relating my experiences to you—don't answer—you came to me for advice, and if I can't give it to you in a constructive way then I am a total failure. I invested in what you see here in my main operator with my own money on a basis of monthly payments; that is, not over \$9.60 a month more than when I purchased the 'wishing' equipment. Now, be smart—take the advice from my four years of experience—when you invest make it an investment in an office fitting to your professional dignity, and your future success and happiness. Start with a clean slate. Start right. It's false economy of the worst kind to handicap yourself with 'wishing' equipment—there goes my nurse's call—it's my next patient."

"Bill, I'm sorry to have taken up so much of your time with my problem. You know I hadn't looked at this business in the way you have explained it.

Getting Ahead in Dentistry

(Continued from page 99)

"Say," cried Dr. Standish, "it's eleven o'clock and I have some early morning appointments. Nevertheless, Charley, you have certainly revealed the possibilities of building up a practice ethically and easily, and if you don't mind I'd like to steal your stuff and put it into actual use in my practice."

"You are welcome to any helpful

material I have," said Dr. Dean, "and I hope all of you will make use of these tried and proved methods."

"Let's not wait until our next committee meeting to get together again. I suggest we meet once a month to discuss our economic problems," said Joe Hurley.

"That is agreeable with me," said Taylor. "One month from tonight let's

I can now see for myself the wisdom of getting started right. What did you say the name of that man is at Hopkins & Spencer Co.?"

"August Pierce—they call him Gus for short. He's a fine chap—knows the dental equipment business from A to Z and you can depend upon his advice and word."

"I'll be back at school next Monday," said Harry, "but you can bet your boots I am going to spend all day tomorrow with Mr. Pierce. Thanks, Bill, for the tip-off. I'll capitalize on your experience."

"To make sure you really will" said Bill, "just slip this in your pocket and read it over from time to time."

"If a man buys something inferior for little money, he will not remember the price but the inferiority."

"If he buys a really superior article for a good price, the quality and services rendered will soon make him forget the price."

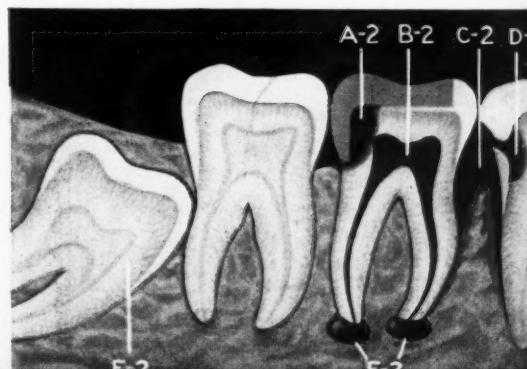
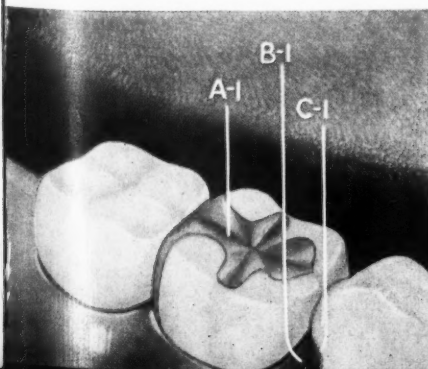
"When he finds out that the superior article won't wear out, he will know that he made a bargain and that the best goods are the cheapest in the end."

meet in my office at the same hour. That will give me time to work out some of Charley Dean's methods and I am hopeful of showing you some improvement in my practice. Is it all agreed?"

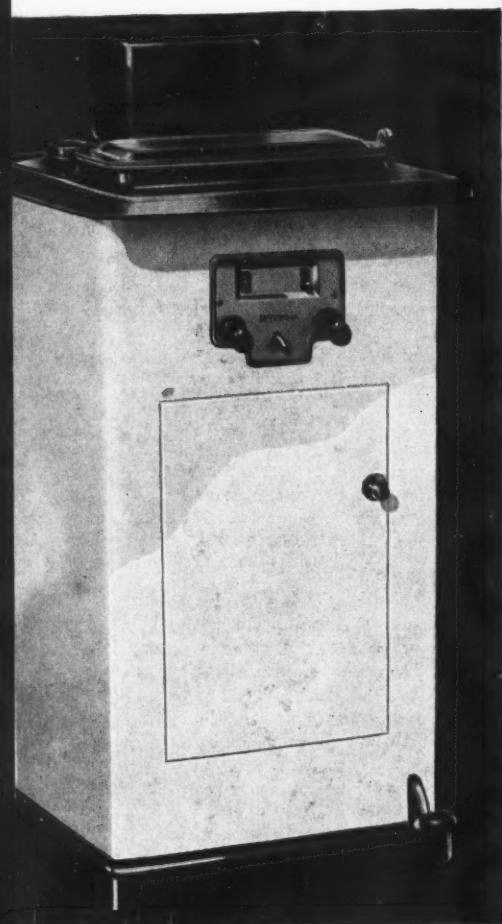
"We will be there Ed," answered the others.

(Left) 'By visual examination alone a dentist sees about one-third of the total dental structures. In this case he sees: (A-1) a gold inlay that appears normal; (B-1) an inflamed area; (C-1) a suspected dark spot on a tooth.'

(Right) "By Roentgenographic examination a dentist sees the entire dental structure and finds that; (A-2) the gold inlay is 'leaking'; (B-2) the pulp is diseased; (C-2) the inflamed gums represent a pyorrhea pocket; (D-2) the 'dark spot' is a deep undermined cavity; (E-2) an impacted third molar, and (F-2) infection at the root ends of a first molar tooth.



Here's what Ritter means by A FULLY AUTOMATIC STERILIZER



An Automatic Safety Switch and Automatic Thermostat don't make a sterilizer fully automatic. All Ritter Sterilizers have both these features—plus four other features that make Ritter Sterilizers (Models A and C) the only ones that are completely automatic.

THIS EXCLUSIVE RITTER DESIGN PROVIDES FOUR VITAL FEATURES OBTAINABLE IN NO OTHER STERILIZER

(1)* Automatic replenishing of water to eliminate constant refilling throughout the day.

(2)* Automatic Preheating

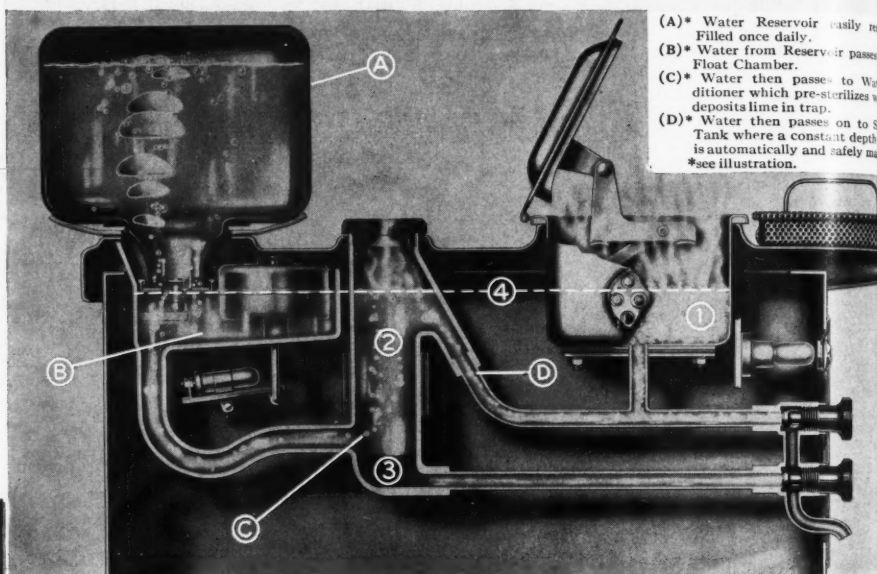
and Presterilizing (Patented) of the water before it is automatically fed into the sterilizing tank. This prevents contamination and automatically insures

* see illustration below

constant sterilizing temperature.

(3)* Automatic removal of excess lime from the water to prevent incrustation of sterilizing tank.

(4)* Automatic maintenance of the proper water level in sterilizing tank, insuring proper immersion of instruments and preventing boiling over.



NATURALLY, you expect any modern sterilizer to have an automatic safety switch to shut off the current when the sterilizing tank runs dry. Of course Ritter Sterilizers have an automatic safety switch. *But unlike other sterilizers, the safety switch in Ritter Sterilizers (Models A and C) is float operated—automatically shutting off the current—before the normal water level is lowered one half inch.* The safety switch prevents the tank from running dry.

You expect any modern sterilizer to have an automatic thermostat for reducing the current once the water has reached the proper sterilizing temperature. Of course Ritter Sterilizers have such an automatic thermostat to insure low current consumption.

Yet, with the exception of Ritter Sterilizers, (Models A and C) these are the *only* automatic features on other makes of sterilizers advertised as fully automatic.

In addition to these features, Ritter Sterilizers (Models A and C) have four additional features of vital importance obtainable in no other sterilizers... features which make Ritter Sterilizers (Models A and C) completely automatic.

When you buy a sterilizer "look under the hood." Study the design and details of their construction. Then you will know why other sterilizers are only *partially automatic*—why Ritter Sterilizers (Models A and C) are the *only* fully automatic sterilizers.

RITTER DENTAL MANUFACTURING CO., INC.
ROCHESTER, N. Y.

Ritter (Models A & C) STERILIZERS

The ONLY Fully Automatic Sterilizers

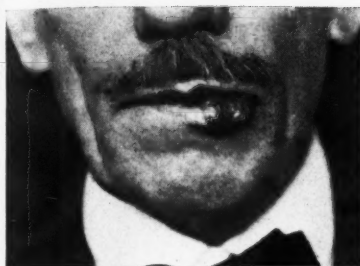


Fig. 12—Carcinoma of the lower lip. Resembles a granuloma pyogenicum, but it does not bleed as readily. Its consistency is hard.

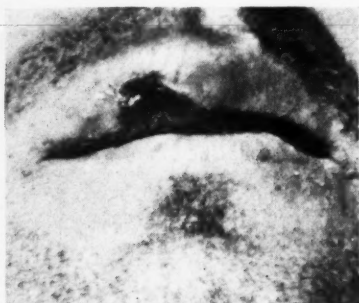


Fig. 13—Chancre of the upper lip. Note the induration about the lesion. (Courtesy of Doctor Howard Fox of New York.)



Fig. 14—Chancre of the upper lip. Note small lesion, composed of vesicles resembling a herpes labialis or "fever blister." A misleading lesion. (Courtesy of Doctor W. H. Guy and F. M. Jakob of Pittsburgh.)



Fig. 15—Chancre of the lower lip. Note the sharp demarcation of its border, there was a yellowish pyogenic membrane over the intra-oral portion of the lesion. (Courtesy of Doctor Howard Fox of New York.)

(Text continued on page 104)

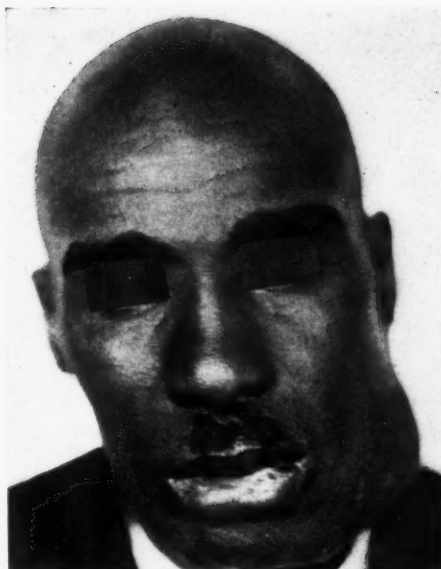


Fig. 17A



Fig. 17B

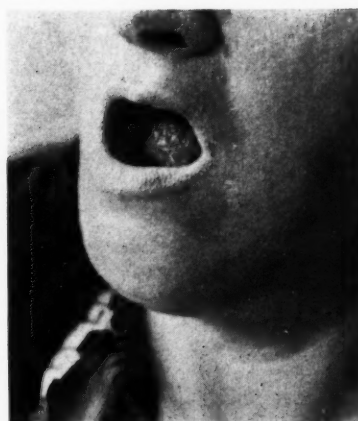


Fig. 16—Chancre of the tongue and floor of the mouth. Note a solitary lesion which bound the tongue down and which was ulcerative. The submental glands were enlarged. The local Wassermann test was of the greatest value in this case.



Fig. 18—Syphilis, secondary mucous patches. Note erosive, elongated papule on tongue and on lips, also hypertrophic papules at the angle of the mouth resembling perleche.

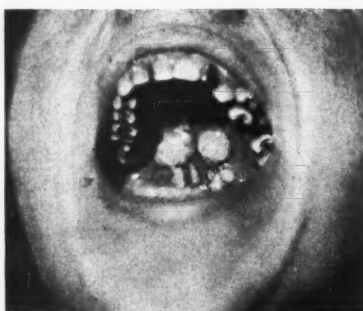


Fig. 20—Secondary syphilis. Described in text. Note flat, rounded raised lesions. This is an uncommon manifestation. (Courtesy of Doctors W. H. Guy and F. M. Jacob.)



Fig. 19—Secondary syphilis. Note ringlike lesions characteristic in the colored race. (Courtesy of Doctors W. H. Guy and F. M. Jacob.)

ous system may become invaded. If this occurs it is manifested by definite changes both in the composition and in the biochemical reaction of the cerebro-spinal fluid. One may accept it as axiomatic that no patient can be considered cured of syphilis until the positive evidence is at hand that these alterations do not exist, or if they did, that they have returned to normal.

For our consideration the most important changes are (1) the cell count and (2) the Wassermann or the Kahn reaction carried out on the spinal fluid. The normal cerebro-spinal fluid shows the presence of lymphocytes or small mononuclear cells to the number of one or two per microscopic field when examined under the low power. When this count rises above eight or ten, it is significant of the presence of a chronic granulomatous process which frequently is syphilis. The Wassermann and Kahn tests are carried out in the same manner as with the serum obtained from the blood stream. A sample of the spinal fluid is obtained by the introduction of a special long and narrow needle between the third and fourth lumbar vertebrae into the

meningeal sac; usually 4 or 5 cc. of spinal fluid are sufficient for these tests.

CAUTION

The most frequent interference with the direct demonstration of the *Treponemata pallida* occurs as the result of the use of antiseptics on a primary sore, and it is needless to point out how frequently this happens, either through ignorance of the patient, or through mistaken identity of the lesion by the medical advisor.

May we further caution the dental surgeon not to use antiseptics, not to use silver nitrate or caustics or cautery of any type on lesions of the mucous membrane until he is absolutely sure that he is not dealing with some formidable condition. This warning holds good for all lesions of the membrane. Too many lives have been put into jeopardy by having the silver nitrate stick applied to a lesion considered to be a cold sore or an ulcer only to have the true nature of the lesion revealed later, when the best chance for a cure is gone.

CLINICAL STAGES OF SYPHILIS

As has been noted for descriptive

purposes, syphilis is divided into three stages. As the mucous membrane of the oral cavity may show evidences of all these stages, and as the manifestations of these various stages are different, we will consider each stage separately.

THE PRIMARY STAGE

At the site of the inoculation of the *Treponemata pallida*, usually within twenty-one to twenty-eight days, there occurs a localized reaction which is varied in its appearance and which has been designated as the primary lesion, and commonly referred to as a *hard chancre*. Among the extra-genital chancres, those occurring on the oral mucosa are the most common; the lip, the tonsil, and the tongue are the most frequent sites, but chancres may occur in any other location in the mouth.

Of Fournier's⁴ 1124 cases of extra-genital chancres, 75.4 per cent occurred about the head; of the latter, 68 per cent or 567 occurred on the lips. Of Bulkley's private cases, 63 per cent occurred about the mouth. Cole⁴ reported 77 per cent of extra-

⁴Footnote 1, fourth reference, page 407.

genital chancres observed by him as occurring on the lips.

Among the unusual sites we have seen one occurring at the lingual surface of the alveolar margin at the upper central incisor. The history pointed definitely to the fact that this was produced by a dental instrument. Four weeks before the appearance of the lesion, while the patient's teeth were being cleaned, the instrument used by the dental surgeon slipped, cutting the inner portion of the gums. This was painful but did not bleed very much. A hard chancre developed at the site of this trauma four weeks later. Another instance was one in which the chancre occurred on the buccal mucosa. This one also followed an accident while the patient was being treated by a dental surgeon.

The most frequent method of transmission of chancres about the mouth is by kissing. There are other methods, such as the common drinking cup (within the last eighteen months we have seen such a case), utensils, tableware, and wind instruments. An unusual form of transmission was traced in a youth, aged 18, who while playing a game which required the biting and passing of an apple, contracted a chancre of the gums.

Parounagian and Goodman⁵ reported 320 chancres of the mouth with the following sources of infection; kissing, in 192 instances; instruments used in certain callings (musicians, glass-blowers, chemists), thirty-seven; smoker's articles, twenty-eight; drinking cups, twenty-six; eating utensils, twenty-two; artificial feeding of children, ten; tooth picks, five.

TYPES OF CHANCRES

1. The most common form of chancre is the so-called hunterian type. It makes its appearance as a painless, small lump, but it develops rapidly in size, and in from two to four days begins to ulcerate. The ulcerating area takes on greater and greater dimensions as the process spreads at its periphery, and the central necrosis in its depth. Although there is a definite margin to be seen, the process extends far beyond it; this can be elicited by palpation. This quality is known as induration, which is always present to some extent, and is one of the important characteristics

of the hard chancre.

The necrotic or ulcerating central area shows a fair amount of exudation, and as these secretions dry together with the debris, they form a thick and well adhering crust which is frequently arranged in a concentric manner denoting its development from day to day. The color of this encrustation depends on the amount of hemorrhage which has taken place, and accordingly varies from brown to various shades of black. Beyond the area of the margin, which is definitely raised, the color of the mucous membrane becomes darker red.

Subjective changes are not marked and discomfort occurs principally on account of secondary infection, which is usually of impetiginous character. After a thick crust is formed which cuts deeply into the underlying tissues discomfort is also felt on motion of the involved parts. As a matter of fact, it is surprising what large lesions may be present and exist practically unnoticed by the patient; for instance, when the chancre is located on the tonsil.

It must be noted at this point that the size of the extra-genital chancre is usually much larger than the genital chancre.

Almost concomitantly with the appearance of this primary lesion, there is a painless swelling to be found in the regional lymph nodes, affecting chiefly those which drain the particular area involved. Although the hunterian chancre is the frequent type, there are also other forms of chancres.

2. The second important variety occurs as a somewhat innocent looking lesion composed of blisters, a herpes simplex or cold sore. If this lesion is carefully investigated, it will be found that it differs clinically from the cold sore in the following characteristics: (a) the prodromal symptoms of the feeling of heat or discomfort, which usually precedes the ordinary herpes simplex, is lacking; (b) when it is formed, the lesion is less sensitive; (c) the encrustation which forms rather rapidly tends to the darker shades of brown and black; (d) and an induration of a feeling of resistance is present which can be elicited by the palpating finger beyond the area of involvement.

The recognition of this more aberrant form of chancre is exceedingly

important, because patients are liable to make light of it, especially if they have been subject to fever blisters or herpes labialis with which they confuse it.

3. Sometimes the chancre appears as a flat, sharply circumscribed lesion resembling the denuded and infected remnant of an erythema multiforme bullosum from which the roof of the bulla has been removed. Those of this type observed by us were intra-oral, one occurring on the mucosa of the lower lip, one on the floor of the mouth. The center of these lesions appeared light brown, showed a markedly adherent necrotic membrane, and the borders were less prominent than that of the ordinary chancre. In both instances there was early and marked regional adenopathy.


4. On the tongue there occurs a type of chancre which is nonulcerative. It is a deep-seated lesion covered with firm mucous membrane, and feels as though a button had been slipped into the muscular coat. Usually this chancre does not reach a large size.

Frequent reference has been made to the involvement of the regional lymph nodes in conjunction with the primary lesion of syphilis, the chancre. The two make up the syndrome that constitutes the primary stage of syphilis. This adenopathy appears as a gradually enlarging swelling which is neither painful nor tender; it is of firm consistency and is somewhat elongated. The overlying skin is unaffected and does not show any inflammatory changes.

The most important corroboratory evidence that the lesion under consideration is a chancre is to be obtained by the use of the local precipitation test (Kahn or Kline) or the local complement fixation test (Wassermann). The dark field examination in the hands of one who is extremely familiar with the appearance of the *Treponemata pallida* is, of course, conclusive, but on account of the presence of other spirillae in the normal mouth, the inexperienced must be exceedingly careful. At this stage the Wassermann or Kahn tests, when applied to serums obtained from the puncture of a distant vein, are usually negative or nonconfirmatory.

(End of First Installment)

⁵Parounagian, M. and Goodman, H.: Chancre of the Lip, *Am. J. Syph.*, July, 1923. p. 563.



The DENTAL SCENE

WAS the Midwinter Meeting of the Chicago Dental Society comparable to the convention of the Honeywell Rubber Manufacturers in the slap stick movie "Convention City?" Generally speaking, I should utter a defiant NO. I have no doubt that the mere name "convention" acts as a safety-valve to a few backwoodsmen, some of whom hail from the metropoli. But, then, perhaps this is the utterance of a Babe in the Woods whose impression was that a dental convention is a serious business—even when imbibing occasionally exceeds the demands of sociability.

As I listened to lectures in the attitude of a reporter, it occurred to me that the audiences were at least as interesting as the lecturers and often reflected the type; that is, inasmuch as attendance is volitional, audiences are often characteristic of the lecturers they choose to hear. I found myself classifying these lecturers though I am not given to labeling. There is, for example, the *jokster-lecturer* who depends on stories and wise-cracks without strict pertinence to win him attention. His audience waits for the joke. For my part such a lecturer is an abomination. Perhaps I have no sense of humor. Then there is the *entertaining lecturer* who intersperses his facts with humorous pointed analogies who makes his facts stick through his good natured pre-

sentation. Such a lecturer is popular and helpful. There is also the *pedantic* type with a limited, bored audience except for a few aspiring pedants. His manner is stilted, studied, soporific. It is more important to him to lecture than that his lecture should convey anything to anyone. In fact, he prefers that it should not be comprehensible; at least, that is his presumption.

There is the *gentle* lecturer who tells his story. He does not read it. He is full of his material and talks to his audience, which, even if large, becomes intimate, and the discussion that follows his talk is spontaneous, encouraging, appreciative. There are two varieties of *dramatic* lecturers: the one who is merely the self-assured, pompous actor; he says nothing forcefully; the other, who is the earnest scholar, has a great deal to say, is carried away by his enthusiasm for his subject which he reflects on his admiring audience. His material is well-organized and dealt out factually. Pencils are active. His speech lends itself to notations.

The *pedagogue* is slightly frightened at first, but he acquires sureness if he is permitted the use of a black-board. Perhaps he has something to say. His audience listens but is cold. There is the *nervous-reader-lecturer* who drones off a stock paper and feels his duty is done. But there is also the *reader-lecturer* who makes

one forget his paper is before him. His paper is written to be read by one who can read well—compelling voice, good diction, good phrasing, faultless pronunciation, pertinent, revealing interpolations—the lecturer who shows forethought, investigation, familiarity with the literature, timely awareness, decision, sense of direction, purposeful wording, sincerity without effort. He is the lecturer supreme whose audience is not only impressed but is provoked into reflective understanding and the will to do. Well, one could go on and on.

A guest should not be too critical, but then, she cannot help observing and noting differences. Perhaps she will be forgiven, then, if she wonders too much why bread and butter lectures and clinics are swarmed. The wherewithal to live is admittedly urgent, but, somehow, one cannot help feeling that the end sought is a bit short-sighted; that there are lectures of farther-reaching, fundamental importance which are meagerly attended. Somehow it seems to the visitor at the dental convention that life takes on peculiar definitions: To one lecturer, *Life is an amalgam restoration*; to another, *Life is a peptic ulcer*; to too many, *Life is a fixed bridge*; to the fortunate, *Life becomes a bright gold inlay*.

—E. H. D.